Evaluating the Accuracy of Speed and Volume Data Obtained via Traffic Detection and Monitoring Devices

By

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ABSTRACT

One of the most controversial topics facing traffic engineers, departments of transportation, and transportation agencies is using an appropriate device in collecting accurate traffic data without creating any negative influence on a traffic flow. Therefore, conducting a field evaluation of traffic data collection detectors become high-priority. This study was initiated to explore a proper device among three non-intrusive ITS sensors to collect a specific traffic parameter in comparison to the Pneumatic Road Tubes (PRTs). The three tested sensors were iCone, Radar Recorder, and Wavetronix SmartSensor HD.

This study conducted a comparison of multiple traffic data collection sensors along on a rural two-lane road (US 24/40) with low traffic volume and a posted speed limit of 55 mph in both winter and spring conditions, in addition to some studies were conducted on iCone at different locations in summer.

This thesis quantifies the difference in accuracy of the devices used for collecting speed and volume traffic data. Also, it identifies the difference in speed distribution due to the presence of tested devices, the accuracy and similarity between devices in gathering speed and/or counts data, and influences on driver behavior in addition to the usability of these devices.

The results showed that the error in detected speeds and volumes for iCone and Radar Recorder in comparison with PRTs were 1.5 percent and 1.4 percent, respectively, while for the Wavetronix SmartSensor HD was 2.1 percent. The error in detected volumes for the iCone and Radar Recorder in comparison with the PRTs were 8.6 percent and 7.8 percent, respectively, while for the Wavetronix SmartSensor HD was same as PRTs detected. Regarding driver

behavior towards deployed devices on the roadside, the largest reduction in speeds was observed when the Wavetronix SmartSensor HD was used. It was also observed that an iCone installation was easier than other devices and it fits to work zones because of its shape.

Based on the results, to collect traffic volume data for each traffic lane separately, regardless of driver response, the Wavetronix SmartSensor HD is recommended. When collecting individual vehicle data is required, with taking into consideration the driver response, the Radar Recorder is recommended. As long as individual vehicle data are not required, the iCone could be a convenient option especially for short time data collection and more specifically at work zones.

Key Words: Pneumatic Road Tubes, iCone, Radar Recorder, Wavetronix SmartSensor HD, ITS, In-roadway sensors, Over-roadway sensors, work zone.

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CHAPTER 1. INTRODUCTION

Traffic systems that provide real-time high-fidelity data are called Intelligent Transportation Systems (ITS). ITS is a generic term for the integrated application of communications, control and information processing technologies to the transportation system to improve safety, reduce travel time, save money, and reduce negative environmental impacts (*1*). ITS can also provide additional operational data for use in decision-making. The quality of the data collected by any device can have impacts on the usefulness of the results. Any bias or error in the data collection can result in non-optimal decisions by highway agencies that use the data (*2*).

ITS infrastructure technologies are classified based on their installation locations to roadway technologies and in-vehicle technologies. In the same context, the currently available roadway ITS technologies are classified according to their locality to in-roadway sensor technologies and over-roadway sensor technologies (*3*). Each class involves many sensors as listed below:

In-roadway sensors

- Pneumatic road tubes
- Inductive loop detectors
- Magnetic sensors
- Piezoelectric sensors

Over-roadway sensors

- Video Image Processors (VIP)
- Microwave radars
- Infrared sensors
- Ultrasonic sensors
- Passive acoustic sensors

The additional perceptible usefulness of ITS can be noticed in work zones. In work zones, the capacity of uninterrupted flow facilities are generally reduced even when lanes are not closed. Risk of crashes increases because of the traffic demand exceeding the reduced capacity and the resulting queues. In order to mitigate this risk, implementing ITS in roadway work zones can be a potential solution (*4*).

Creating a smart work zone, which is deploying intelligent transportation technology in construction zones, has an important role in increasing safety and providing motorists with significant information regarding delays and travel times. It also collects historic and real-time traffic data, which can be use in future design and construction projects. The accuracy and reliability of the data depends on the number and placement of the monitoring devices on a roadway segment. The effectiveness of smart zones is based on providing web-based reporting system, which allows monitoring construction activities and quick assessments of work zone performance, thus evaluating and responding to the situations on the site (*5*).

One of the most challenging issues in the field of ITS is increasing the accuracy of traffic detector data. The competing goals of the data users' desire to get an accurate detector within budget constraints and manufactures' competition to produce the least error at the lowest cost have propelled the demand to evaluate detectors (*6*).

1.1 Research Overview

A measurement, no matter how meticulously made, is never perfect (*7*). The primary objective of this thesis is to quantify the difference in accuracy of the devices used for collecting speed and volume traffic data. The secondary objectives were to identify: (a) the difference in speed

distribution due to the presence of various portable devices, (b) the accuracy and similarity between devices in gathering speed and/or count data, and (c) influences on driver behavior in addition to the usability of these devices.

An appropriate test site was selected and four devices were tested. One of the devices used was the control device with which the other three devices were compared. The selected location was near the Lawrence Municipal Airport on US-24/40, between E 1600 Rd. and E 1500 Rd., Northeast of Lawrence, Kansas.

1.2 Contribution to the State of the Art

The research will demonstrate the accuracy of each device in comparison to the control device. The result will aid researchers in understanding the impact of these devices in collecting data and the effectiveness of the devices on driver response on two-lane rural highway. Based on this, the researchers can select an appropriate device among these devices to collect specific traffic data such as speed, volume, and vehicle classifications.

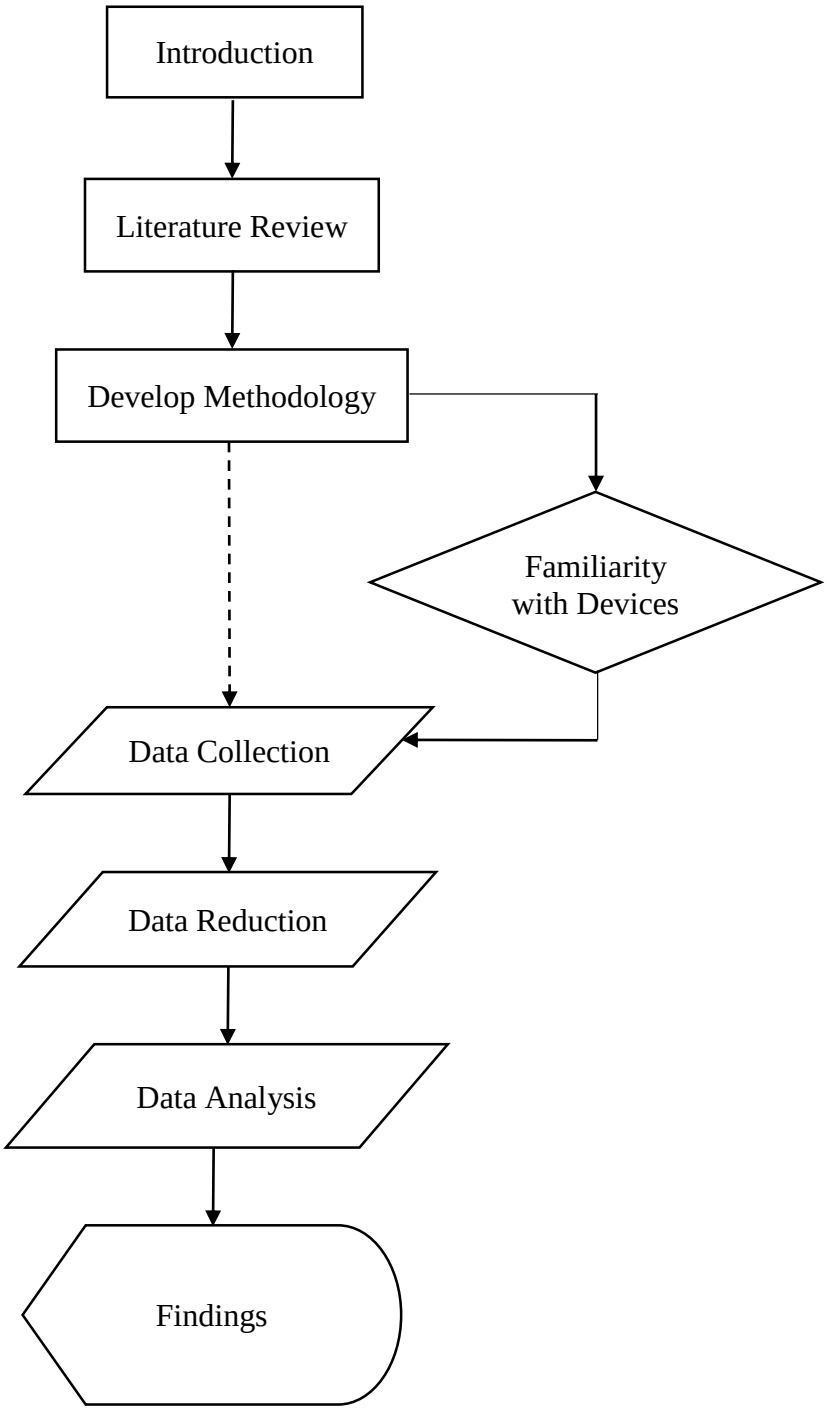
1.3 Organization of the Thesis

As show in the flow chart below, this thesis is organized into the following chapters: 1) Introduction; 2) Literature review; 3) Methodology; 4) Familiarity with Devices; 5)Data Collection; 6) Data Analysis; 7) Findings and Recommendations; and 8) Future research . A list of references and appendixes follow these chapters.

Chapter 1, Introduction, discusses the importance of ITS for safety, travel time, economy and environment. The existing types of ITS technologies and their significance in collecting data

are also mentioned in this chapter. Chapter 2 reviews previous studies conducted to evaluate the various ITS devices and compare the effectiveness of each technology in collecting accurate data and their usability in different traffic conditions. Chapter 3 shows four devices used in this study include Pneumatic Road Tubes, Wavetronix SmartSensor HD, Radar Recorder, and iCone. The chapter also illustrates the principles of site selection for this study and test conditions. Chapter 4 describes the devices were used in this study and the tests conducted with the iCone to understand its technique in collecting traffic data, because contradicting results were observed in some literature about the accuracy of data collected by the iCone. Chapter 5 presents the data collection procedures, which were followed for this study. Chapter 6. Illustrates the data reduction procedures to prepare data for conducting the statistical analyses. Chapter 7 presents the analysis that was conducted on the collected data and the results of the comparison of the devices with the control device. Chapter 8 summarizes the research effort and presents the conclusion and recommendations of this study. Lastly, Chapter 9 suggests the opportunities to conduct some research relative to this study in the future.

Flow Chart


Introduction
Literature Review
Develop Methodology
Familiarity with Devices
Data Collection
Data Reduction
Data Analysis
Findings

CHAPTER 2. LITERATURE REVIEW

With the growing demands on the transportation system because of population growth, traffic congestion presented a serious challenge to the entire system. In order to increase capacity and to improve the efficiency of the existing transportation system, which focuses on building fewer lane-miles, investing in ITS infrastructure is one of the best options (*8*).

Investing in ITS creates a revolution and encourages manufacturers and researchers to develop new technologies with advantages in installation, detection, and maintenance. These technologies challenge conventional traffic data collection methods such as; inductive loop detectors and PRTs (*9*). In this context, to evaluate new detectors with new technologies for collecting traffic data instead of conventional detectors, it is necessary to understand the accuracy, reliability, and efficiency of detectors performance.

In 2006, Klein, et al. offered an inclusive reference guide to support the practicing traffic engineers, planners, or technicians in selecting, planning, installing, and maintaining traffic sensors. They classified traffic detectors in two families: in-roadway sensors, and over-roadway sensors. In-roadway sensor technologies were embedded either in the pavement or in the subgrade of the roadway or could be taped or attached to the surface of the roadway. In contrast, over-roadway sensor technologies were installed above the surface of the roadway itself or alongside the roadway. The most common examples of in-roadway sensors were inductive-loop detectors, which were fixed into the pavement; magnetometers, which were placed underneath a paved roadway or bridge structure; and PRTs, which were mounted on the roadway surface. Common over-roadway sensors are Video Image Processors (VIP) that utilize cameras fixed on

poles adjacent to the roadway; microwave radar, ultrasonic, and passive infrared sensors which can be almost similarly deployed; and laser radar sensors installed on structures that spanned the lanes to be monitored (*10*).

Many studies were conducted to evaluate new detectors against either conventional in-roadway sensors or other over-roadway sensors as shown below.

2.1 In-Roadway Sensors

2.1.1 Loop Detectors

Since its introduction in the early 1960s, loop detectors, as an intrusive sensor, have become the most utilized ITS sensor in a traffic management system. Today, most vehicle detection relies on inductive loop detectors because of their effectiveness and accuracy in collecting traffic data. Therefore, to exam the accuracy of most new or improved detectors, they are compare against loop detectors.

Several research projects, shown in Table 1, were conducted to study the accuracy and effectiveness of different new sensors in traffic data collection versus loop detectors. These evaluation studies were focused on different traffic parameters such as speed, volume, and vehicle classification detected by these detectors in addition to reliability, usability, and cost of each detector.

Table 1. Previous Studies on In-Roadway Sensors with Loop Detectors

No	Year	Location	Devices Used	Research Subject	Researchers
1	2010	Minnesota	Single Loop, Dual-Loop & iCone	Monitoring Traffic in Work Zones: The iCone System.	SRF Consulting Group
2	2010	Italy	*SMART Project	Data accuracy of automatic traffic counting: the SMART project results	Bellucci and Cipriani
3	2012	California	Dual-Loop & iCone	Evaluating iCone Speed Value against Dual-Loop Speed Values.	Kuhn and Bailey
4	2014	Minnesota	**Nine Sensors	Traffic Data Collection Improvements	Marti et al.

*Inductive loops, WIM (Weight in Motion) based on piezoelectric sensors, WIM based on quartz sensors, Image recognition (video systems), double technology (radar and laser sensors), triple technology (radar, passive and ultracoustic sensors), and Laser technology.
**Countingcars.com COUNTcam, Miovision Scout, JAMAR Radar Recorder, Wavetronix SmartSensor HD, Houston Radar Armadillo Tracker, Sensys VSN240F, JAMAR Stealth Stud, and Road Tubes with PicoCount 2500 classifier versus loop-piezo-piezo-loop automatic traffic recorder (ATR).

In 2010, SRF Consulting Group and SSR examined the accuracy of iCones in collecting traffic speeds against a loop detector baseline after collecting data for two years in two work zones on I-394 and I-35W in Minnesota. On I-394 at a three-lane Non-Intrusive Technologies (NIT) test site, a dual loop detector baseline and iCones were used, while a single loop detector and iCones were deployed on I-35 W. The evaluation of iCones was conducted through comparing the average difference of speeds, which were detected by the iCones and the loop detector baselines. At the NIT test site, the iCone data for the closest lane to the iCone were compared to dual-loop speed data for all three lanes at the same time.

They found that the average speeds at the NIT test site for all three lanes was three miles per hours (five percent error) lower than speeds detected by iCones and two miles per hours (four percent error) lower than speeds detected by iCones for the closest lane to the iCone. The average difference was much higher on I-35W because the single loop detectors were not as accurate as dual loop detectors or iCones as shown in Table 2 (*11*).

Table 2. Speed Accuracy Results in Minnesota (11)

Test location	Test Date	Test Time of Day	Speed Difference* (mph)	Speed Standard Deviation	Average Percent Difference
NIT Test Site	8/14/2009	Midnight to 7:00am	3	2.6	5%
NIT Test Site	8/17/2009	8:00am - 10:00am	2	2	4%
NIT Test Site	9/2/2009	Midnight to 7:00am	2	3.6	4%
I-35W at I-35E	8/15/09 to 8/20/2009	Continuous	11	8.2	18%

*Speed difference = Speed measured by iCone – speed measured by loop detectors

In 2010, Bellucci and Cipriani presented the results of an experimental survey on traffic monitoring devices called the SMART Project, which was designed to evaluate traffic monitoring systems individually and collectively for accuracy in traffic counting and reliability in relation to three main types of application: statistical (traffic census), road design, and real-time traffic management. The project was conducted on a 200-meter section of the Aurelian Way in Italy for 12 months under different traffic and weather conditions. Seven different monitoring sets were used to accomplish the assessment, which included inductive loops, Weight in Motion (WIM) based on piezoelectric sensors, WIM based on quartz sensors, Image Recognition (video systems), double technology (radar and laser sensors), triple technology (radar, passive and ultracoustic sensors), and laser technology.

The 200 meters section was divided into 4 sections (50 meters/section) and included an overpass bridge. The overpass bridge was the first section and it was equipped with four devices: the video image recognition system, the triple technology system, the double technology system and the laser system. The WIM systems, based on piezoelectric sensors, were installed in the second section.

Inductive loops and WIM systems based on quartz sensors were installed in the third and fourth sections, respectively. In addition, two video cameras for daytime and two active infrared lasers for nighttime were set up as reference measuring systems to check and validate the other devices under test. After counting vehicles manually through checking the recorded video images, the results were compared with the volume detected by the devices being tested to find the expected error (*em*) of the device, its uncertainty (*U*), and sensitivity to environmental conditions such as the climate, lighting, traffic density, and rain. As shown in Table 3, the devices using multiple technologies, generally, such as the double technology system, which adopts the radar technology, had a better accuracy, while poor performances was obtained from devices using a single technology. The data indicated that inductive loops were more reliable than the other systems, while WIM devices had the poorest performance in the mean time between failure (MTBF) parameter, as shown in the Table 4 (*12*).

Table 3. Average Profile of the Devices Being Tested, Italy (12)

Device	Real time		Road Design		Statistical Analysis		Environmental sensitivity			
	em	*U*	*em*	*U*	*em*	*U*	Climate	Lighting	Traffic	Rain
Double technology	6.2	±1.4	3.4	±1.6	2.6	±0.6	○	○	○	●
Triple technology	10.9	±1.8	4.3	±0.6	3.5	±0.7	○	○	○	●
WIM Piezoelectric	10.8	±2.3	7.4	±1.4	5.7	±1.8	●●○	○	○	●○
Inductive loops	14.8	±1.2	10.6	±0.9	9.4	±1.3	●	○	○	●
WIM Quartz	30.7	±3.8	17.6	±2.6	12.3	±4.1	●●●●●	●○	●	●●
Laser scanner	40.1	±3.4	24.1	±2.0	19.8	±3.6	●	●○	●	●
Video Image	—	—	—	—	34.1	±4.9	●	●●●●●		●

Note: A qualitative assessment of their sensibility to environmental conditions was described by scores ranging from "very low sensitivity" (○) to "very high sensitivity" ●●●●●, through intermediate values expressed by a 0.5 score resolution (○=0. 5; ●=1).

Table 4. Reliability of the Devices under Test, Italy (12)

Device	MTBF (h)
Inductive Loops	5064
Laser Scanner	1094
Video Image	1026
Double Technology	946
Triple Technology	549
WIM Piezoelectric	531
WIM Quartz	85

In 2012, Kuhn and Bailey evaluated the iCone as a new product against dual-loop detectors to compare traffic speed values at the Berkeley Highway Laboratory (BHL) Testbed–A 2.7–mile section of US Interstate 80, in Berkeley, California. The BHL Testbed, an urban freeway, is comprised of five lanes in each direction, including eight video cameras and eight pairs of directional dual-loop stations. The data were collected using five iCones deployed at five BHL dual-loop stations for more than two months. The iCone reported average speed data every two minutes, while the loop detectors reported the data for every vehicle that passed over it. Therefore, the data collected by dual-loops corresponded to iCone's data (average speed for each two-minute period).

After this conformity and by the comparative statistical analysis of the data by lane and across all lanes at each station, the researchers found that the error of the iCone speed values for the farthest lane was 15 mph more than the nearby lane from the iCone. The researchers suggested that the iCone was more accurate in detecting traffic speed for the nearest lanes than

the farthest lanes and the difference occurred due to vehicles in the near lanes blocking the radar's ability to detect the vehicles in the farthest lanes (*13*).

In 2014, Marti et al. compared multiple traffic data collection sensors and collected information on ease of deployment, accuracy, and costs associated with each technology on a two-lane rural road (Sibley County, State Aid Highway 9) with low traffic volumes in both winter and spring conditions near Arlington, Minnesota. The following sensors were set up and supervised as part of this study: Countingcars.com COUNTcam, Miovision Scout, JAMAR Radar Recorder, Wavetronix SmartSensor HD, Houston Radar Armadillo Tracker, Sensys VSN240F, JAMAR Stealth Stud, and Road Tubes with PicoCount 2500 classifier versus loop-piezo-piezo-loop automatic traffic recorder (ATR) installed by the Minnesota Department of Transportation (MnDOT) and used as a control device for this study.

They established that the radar recorder was more accurate than the other sensors in traffic volume detection by one percent error while the Wavetronix HD was the most accurate sensor in classification capability. For speed detecting accuracy, the researchers found that the JAMAR radar recorder and the Wavetronix HD were the most accurate sensors with 1.2 percent error among the sensors. Also, they found that each of Countingcars.com COUNTcam, Miovision Scout, Sensys VSN240F, and Road Tubes, easier sensors to use than the others, but the Road Tubes with PicoCount 2500 classifier was assessed as a lowest cost sensor as shown in Table 5 (*14*).

Table 5. Data Accuracy Findings for Each Sensor, Minnesota (14)

Sensor	Volume Percent Error	Speed Percent Error	Length Classification Percent Error	Ease of Use	Cost
COUNTcam	2.40%	Sensor does not record	7.10%	Very easy	$1,499 + $1,995 (software)
Scout	1.80%	Sensor does not record	8.40%	Very easy	$5,000 + pole + $6/hr. of processing
Radar Recorder	1.00%	1.20%	7.70%	Easy installation, but requires road geometry measurement for setup	$4,145
Wavetronix HD	2.40%	1.20%	4.50%	Easy setup, but requires a portable trailer or roadside infrastructure for mounting	$5,500 + trailer/pole
Houston Radar	4.10%	3.50%	*See Note	Easy installation, but requires careful aiming	$2,500 + pole
Sensys	1.50%	5.90%	14.80%	Very easy	$3,000
Road Tubes	6.80%	4.20%	16.50%	Very easy	$500

* Sensor does not differentiate between single-unit and multi-unit trucks. Analysis was performed by combining these vehicle length bins. The sensor differentiated passenger vehicles from trucks with a 8.7 percent error.
Note: the ATR baseline has some inherent error. The results shown simply demonstrate how well the sensor data matched the ATR data.

2.1.2 Pneumatic Road Tube

PRTs are another common use traffic data collection devices, which are able to collect high accurate traffic data such as speed, volume, vehicle classification, and the time of day associated with each data sample. Because of its accuracy, easy to install, and low cost, the PRTs have been used as a control device to evaluate the effectiveness of other traffic detectors. Table 6 shows some of those evaluation studies have been conducted comparing PRTs with different detectors.

Table 6. Previous Studies on In-Roadway Sensors with PRTs

No.	Year	Location	Devices Used	Research Subject	Researchers
1	2004	Texas	Traffic classifier with pneumatic tubes, traffic classifier with piezoelectric sensors, tape switches, radar, and LIDAR	Comparison of portable speed measurement devices	Gates, et al.
2	2010	California	iCone	California Deployment of Portable Traffic-Monitoring Devices	Chandler, et al.
3	2011	Kansas	Pneumatic road tubes, Smart Sensor, Autoscope, and Lidar	Effect on Speed Distribution due to Intrusive and Non-Intrusive Portable Speed Measurement Devices	Jasrotia
4	2012	Iowa	Pneumatic Road Tubes and mobile video trailer	Measuring Horizontal Curve Vehicle Trajectories and Speed Profiles: Pneumatic Road Tube and Video Methods	Fitzsimmons, et al.

Gates, et al. (2004) evaluated five common portable speed measurement systems: traffic classifier with pneumatic tubes, traffic classifier with piezoelectric sensors, tape switches, radar, and LIDAR in a controlled field evaluation. A test vehicle with a calibrated distance measuring instrument (DMI) was used to make 100 passes through the test site at two speed levels (50 passes at 55 mph, 50 passes at 35 mph), and the speeds were recorded by each device for each pass. The DMI speed was considered as a true speed for each pass, and deviations from the DMI speed for a given device were considered errors. For statistical analysis, paired t-tests were done on the speed data measured by each device against the DMI.

The researchers found that all devices performed equally well for the 35-mph trials while Lidar and radar were the most accurate and precise devices for the 55-mph trials and errors that occurred for a single speed measurement were relatively small (less than ±1.5 mph). There was a small deviation in performance between on-pavement devices (i.e., tubes, piezoelectric sensors,

and tape switches) and those inaccuracies likely were caused by slight measurement errors during installing the sensors or movement of the sensors resulting from frequent tires passing as shown in Table 7 (*15*).

Table 7. Mean and Standard Deviation of Speeds Recorded by Each Device (15)

Speed Level (mph)		"True" Speed (mph)	On-Pavement Devices (mph)						Handheld Devices (mph)	
	Statistic	DMI	Tube 1	Tube 2	Tube 3	Piezo 1	Piezo 2	Tape Switch	Radar	Lidar
35	Mean	35	Error	35.04	35.02	35.12*	35.18*	Not Used	34.88*	35.02
	Standard Deviation	0		0.2	0.14	0.33	0.39		0.33	0.14
55	Mean	55	54.65*	55.42*	55.26*	55.23*	Error	55.26*	54.98	55.14*
	Standard Deviation	0	0.48	0.54	0.44	0.61		0.31	0.15	0.35

* Mean speed for the device is statistically different from DMI speed (based on paired *t*-test at alpha = 0.05).

In 2010, Chandler, et al. tested the ability of the iCone to provide real-time traffic conditions in work zones and the effectiveness of information, which was collected by the device to improve safety and mobility in work zones. The devices were distributed to a number of California Department of Transportation (Caltrans) districts, including District 2 in Northeastern California, District 4 in the San Francisco Bay Area, District 5 along the coastline, District 7 in Los Angeles, and District 12 in Orange County. Then they focused on District 4 and deployed the devices on the Bay Bridge between Oakland and San Francisco, on I-680 in Walnut Creek, on Highway 101 on the Golden Gate Bridge, on I-880 in Oakland, and in Pasadena.

The iCone speed data were sufficiently accurate when compared with speed data collected from nearby permanent traffic-monitoring stations. In Orange County, they used iCone to count traffic on a one-lane ramp and on two-lane undivided highways and they found that the iCone data sufficiently matched when compared with those data gotten from pneumatic tube counters. They also reported that the device was easy to install and maintain, and using the web-based user interface was uncomplicated. Furthermore, it had a significant effect on reducing the cost of data collection and enabling an agency to monitor traffic activities remotely in the areas that frequently needed attention. During the five-month test period, the researchers reported several challenges in regards to data collection using an iCone such as: unintentional relocation of the iCone by work crew, provision of proper deployment space, battery recharging, and labor requirements (*16*).

In 2011, Jasrotia assessed the effectiveness of presenting four intrusive and non-intrusive traffic devices on driver responses to change speed, thereby the speed distribution by using PRTs, Smart Sensor Digital Radar, Autoscope with camera trailer, and Lidar gun on US 59, US 24, and US 24/40 in Kansas. By applying a statistical t - test with 95 percent confidence level to analyze the data, the researcher concluded that vehicle speeds were reduced when the Lidar gun or Autoscope with camera trailer was visible on the roadside. Increased speeds were observed when the Smart Sensor was installed because it was practically invisible from afar due to its modest size. There was no significant difference in speed when the PRTs were installed. Furthermore, through comparing drivers who were driving above the 85th percentile speeds, the similar effects were observed (*17*).

In 2012, Fitzsimmons, et al. studied the effectiveness and accuracy of a PRTs set up in a z-configuration and a mobile video trailer for collecting vehicles' operational data such as vehicle type, gap, lateral position within the lane, and speed along horizontal curves on closed and open courses. Closed-course studies investigated a single data collection station setup, while an open-course study investigated multiple data collection stations on a horizontal curve. A closed course study was performed in a parking lot and on a closed city road, while an opened course study was performed in a horizontal curve site near Amen, Iowa.

To conduct the data collection process, a set of z- configured PRTs was used for the closed course in a parking lot thirty-six. Observations were made with speeds less than 35 mph and same number of observations was made in a closed city road at 55 mph. On the other hand, seven sets of z- configured PRTs and four-channel digital video recorder that captures video from two cameras positioned at a lower elevation and two elevated cameras located 30 ft. above the ground were utilized to conduct this study over a two-weekday time frame for an opened course study. Baseline data were also collected with two sets of PRTs at the point of curvature (PC) and center of curvature (CC) only. The PRTs were in use for 19 hours and captured both daytime and nighttime traffic data, while the video trailer was utilized during the daylight hours only for six hours with and without the seven sets of road tubes. Assessing the accuracy of PRTs installed in a z-configuration in comparison with physical measurements was conducted during two closed-course tests.

After developing histograms of both data sources along with Q-Q plots and Shapiro-Wilk tests to indicate the normality of the data distribution, a parametric paired t-test and nonparametric Wilcoxon signed-rank test at the 95 percent and 99 percent confidence level were

applied. The results of the analysis revealed that there was not enough evidence to reject the null hypothesis at both levels of confidence and the z-configured PRTs were found accurate in capturing vehicle lateral position and this accuracy was true for a wide range of vehicle speeds ranging from 19 to 51 mph.

The open course study evaluated the accuracy of seven z-configured pneumatic road tube sets located on the outside lane of the horizontal curve in comparison with digital video recorder. Both parametric paired t-tests and nonparametric Wilcoxon signed-rank tests were used at the 95 percent level of confidence to compare data distributions. The tests indicated the PRTs provided a higher level of accuracy as compared with the digital video data. The researchers examined the accuracy and effectiveness of video-based data collection compared with pneumatic road tube data for individual vehicle speeds and lateral distances.

After verifying the normality of data distribution based on a Shapiro-Wilk test for data collected by the PRTs and digital video, the researchers tested whether the mean difference of the distributions between observations was zero at the 95 percent level of confidence. Paired t-test and Wilcoxon signed-rank found that the PRTs were more accurate in collecting lateral distance data and automated vehicle speed extraction provided a quick way to capture vehicle speed for both day and night conditions.

Determining the effects of equipment along the roadway to driver behavior during both day and nighttime conditions was a significant characteristic in collecting accurate data. Therefore, this study investigated that effect under the various conditions, including two sets of road tubes compared with seven sets of road tubes, vehicles traveling during the day compared with the vehicle traveling at night, and seven sets of road tubes compared with the presence of

the video trailer with the road tubes. The effects of equipment presence or time of day on driver behavior are shown in Figure 1, with the null hypothesis stating that a population mean in a before and after each condition is equal. The statistical tests were performed at the 95 percent level of confidence level and found that all conditions were statistically different, including the presence of the video trailer as well as both day and night (*18*).

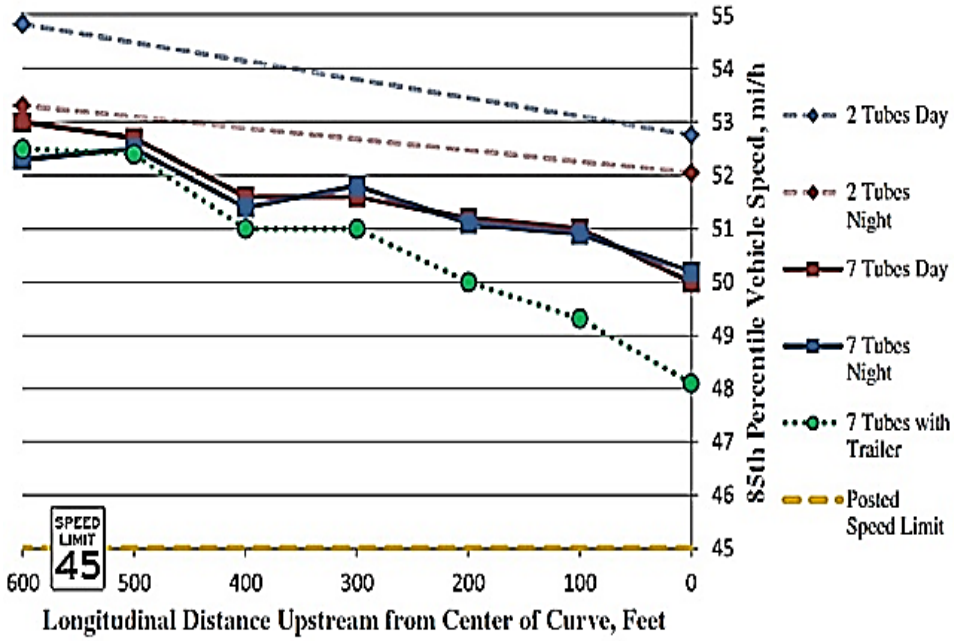


Figure 1. Eighty-fifth percentile speed profile for combinations of equipment and time of day (18).

2.2 Over-Roadway Sensors

Table 8 lists the previous evaluation studies on the different over-roadway sensors. These studies compared various sensors that use various technologies such as radar, infrared, microwave, image, and laser. The evaluation was based on collecting accurate traffic data such as speed, volume, and vehicle classification in addition to their reliability, usability, and cost of each detector.

Table 8. Previous Studies with Different Over-Roadway Sensors

No.	Year	Location	Devices Used	Research Subject	Researchers
1	2009	India	**TRAZER System	Traffic data collection under mixed traffic conditions using video image processing	Mallikarjuna, et al.
2	2009	California	iCone, Blufax, LPR, and Adaptir	Deploying Portable Advanced Traveler Information Systems: Redding Deployment Evaluation	Staszcuk and McGowan
3	2010	Hawaii	Autoscope, TIRTL, and SmartSensor HD	Evaluation of Autoscope, SmartSensor HD, and Infra-Red Traffic Logger for Vehicle Classification	Yu, et al.
4	2011	Hawaii	Autoscope, Smart sensor HD, and TIRTL	Reliability of Automatic Traffic Monitoring with Non-Intrusive Sensors	Yu, et al.
5	2012	California	iCones & LIDAR	Evaluation of Methods to Reduce Speed in Work Zones	Ravani, et al.
6	2012	Nevada	HSCM and Autoscope	Video Based Vehicle Detection and its Application in Intelligent Transportation Systems	Chintalacheruvu and Muthukumar
7	2013	Hawaii	* Six Sensors	Performance and Challenges in Utilizing Non-Intrusive Sensors for Traffic Data Collection	Yu and Prevedouros

*Autoscope Rack Vision (Autoscope) with image processing technology (VIP), Infra-red Traffic Logger (TIRTL) with active infrared technology, Remote Traffic Microwave Sensor (RTMS), Smart Sensor 105 (SS105) and SmartSensor HD (SSHD) with microwave radar technology, and SmarTek's Acoustic Sensor (SAS-1) with passive acoustic.
**Type of video image processing system (VIPS).

In 2009, Mallikarjuna, et al. tested the capabilities of a traffic analyzer and enumerator system named (TRAZER), which was a type of video image processing system (VIPS), in traffic data collection under mixed traffic conditions in developing countries. The study presented the efficiency of this image processing-based data collection system, which is able to analyze traffic videos and provide macroscopic traffic characteristics such as: classified vehicle flows, average

vehicle speeds, and average occupancies. The study also investigated microscopic characteristics such as individual vehicle trajectories, lateral, and longitudinal spacing.

The data for this study were collected by the TRAZER system and manual data collection from 15 videos recordings at three-way intersections at various parts of Delhi, India with varied angles and under different lighting conditions. The data obtained from the TRAZER was compared with the data collected manually to find the difference ratio of classified vehicles and the detected flow by both methods were shown in Table 9 and Table 10. The researchers found that even under highly congested traffic conditions, the TRAZER had a capability of tracking vehicles and capturing lateral movements, which was a typical feature of no-lane disciplined traffic (*19*).

Table 9. Flow Values Obtained from TRAZER and Observed Flow in Delhi, India (19)

Vehicle type	Observed flow (veh/30min)	From TRAZER	Classified vehicles	Miss	Junk	Cross classification FP*			% accuracy
						Auto	HMV	LMV	
LMV	104	98	90	6	0	0	0	0	94
HMV	7	7	7	0	0	0	0	0	100
Auto	3	2	2	1	9	0	7	0	67
TW	52	48	48	4	17	0	0	0	92
Total									88.25

Note: *false positives; TW=motorized two wheeler; LMV=light motor vehicle: Auto=motorized three wheeler; LCV=light commercial vehicle; and
HMV=heavy motor vehicle.

Table 10. Comparison of Observed Flow and Flow Values Obtained from TRAZER in Delhi, India (19)

Time	Observed Flow (veh/15min)					Flow from TRAZER (veh/15min)				
	LMV	HMV	Auto	TW	Total	LMV	HMV	Auto	TW	Total
10:15–10:30	417	8	24	354	803	376	7	24	340	747
10:30–10:45	417	8	24	344	793	368	7	24	321	720
10:45–11:00	356	5	28	268	657	320	5	28	250	603
11:00–11:15	327	9	17	254	607	304	9	17	246	576
Total	1,517	30	93	1,220	2,860	1,368	28	93	1,157	2,646

Note: TW=motorized two-wheeler; LMV=light motor vehicle; Auto=motorized three-wheeler; LCV=light commercial vehicle; and HMV=heavy motor vehicle.

In 2009, Staszcuk and McGowan evaluated three characteristics; the accuracy, reliability, and the usability of Advanced Traveler Information System (ATIS). This portable system, which provides real -time traffic information to travelers, included four different devices: iCone, Blufax, License Plate Reader (LPR), and Adaptir system, which includes Remote Traffic Microwave Sensors (RTMS). The data were collected for two weeks at five different sites in Redding, CA. To evaluate the accuracy of both the iCone and Adaptir systems, five-minute average speeds were used to determine the difference in recorded speed. For the Blufax and LPR system, the collected travel times were compared to GPS baseline data. The reliability of the iCone, Blufax, LPR, and Adaptir were tested through describing the failures and maintenance required during the demonstration. The researchers also measured the usability of those portable

systems (iCone, Blufax, LPR, and Adaptir) based on setup times, ease of system usage, usefulness, and impact of the systems on drivers.

Regarding the accuracy from the speeds measured by both the iCone and Adaptir systems, the researchers found that the differences were less than 10 mph at least 99 percent of the time for all three locations. The travel times measured by the Blufax and LPR systems indicated that the average error was less than 10 seconds for 100 percent of the time as shown in Table 11. Sometimes a construction worker relocated the iCone unintentionally, because it looked like a normal construction drum (*20*).

Table 11. Summary of Results Redding, CA (20)

System	Measures	Accuracy*	Reliability**	Usability***	Integrated System****
Blufax	Travel time	100% < 10 sec	B, C	Easy	No
iCone	Speed	99% < 10 mph	M, B	Easy	Partial
LPR	Travel time	98% < 10 sec	M, B, O, C	Hard	No
Adaptir	Speed	99% < 10 mph	M, B	Medium	Yes

* Accuracy presented as the percentage of time the maximum error is less than a specified threshold.
** Reliability challenges included: M – a unit was accidentally moved by construction workers, B – the units required a recharge of the battery, O – the unit shut down apparently due to overheating, C – during periods of low traffic the system was unable to report travel time due to low capture rate.
*** Note the usability categorization is based on the authors' opinions and may be subjective. For more detail on specific usability issues, refer to the body of this report.
****presented the ability to report real-time status to traffic management center (TMC).

In 2010, Yu, et al. evaluated the accuracy and reliability of three nonintrusive traffic detectors for automatic vehicle classification: Autoscope Rack Vision Terra, the Infra-Red Traffic Logger (TIRTL), and SmartSensor HD. The data collection was performed at four sites during both daytime and nighttime in Honolulu, Hawaii: the Autoscope sensor trailer and TIRTL

were tested at Dole Street for 47 hours and Sand Island Road for three hours, the SmartSensor HD and Autoscope at Makiki Street for six hours, and the Autoscope sensor trailer at 7th Avenue for more than 12 hours.

To evaluate the accuracy of the sensors, the comparison between the number of vehicles classified by the sensor and manually classified vehicles was conducted for each site and for the conditions (influence factors) which affect the sensors accuracy in classification tasks. For instance, the influence factors for the Autoscope were day-night time, weather, traffic conditions, and shadow. For the TIRTL, the influence factors were flat and sloped pavement surface, and for the SmartSensor HD the influence factors were the lane where vehicles were detected during the peak and off-peak periods.

The researchers found that during the daytime at a four-lane arterial site where the average vehicle speed was low (25 mph), traffic volume was light to moderate, and heavy vehicles were rare (less than one percent), the Autoscope Classification accuracy was adequate. But because of the sensitivity of the sensor to illumination, shadows of surrounding obstacles, and weather variations, the accuracy sharply degraded at night and when the weather conditions were rainy or shadows existed in the detected area. Autoscope also had no tendency of degradation from the nearest to the farthest lane and had a good classification accuracy for passenger cars, trucks, and large vehicles, the accuracy for motorcycles and mopeds was very poor, nearly zero percent.

The classification accuracy of each vehicle class by the SmartSensor HD was inadequate because the accuracy degraded from the nearest lane to the farthest lane. It also missed and the tendency to double count increased during congested periods. Classification counts by TIRTL

were good for the lane with flat pavement, while for another lane with a sloped surface it was inadequate. The study remarked that the truck classification by TIRTL was very good, but some misclassifications occurred when distinguishing passenger cars from pickups and vans. Overall, the researchers concluded that the infrared sensor TIRTL provided ±5 percent error of axle-based classification under ideal conditions, which is reliable in comparison to the video imaging and microwave sensors (*21*).

In 2011, Yu, et al. evaluated the performance of three portable and semiportable non-intrusive sensors: video image processing (Autoscope), microwave radar (Smart sensor HD), and an active infrared (TIRTL) technology under various traffic and environmental conditions in collecting data of vehicle classification, volume, and speed. The study was conducted at four sites in Oahu Island, Hawaii:

- Zipper HOV lane on Interstate H-1, using the Autoscope, Smart sensor HD, and the TIRTL in addition to utilizing International Road Dynamics loop detector (IRD loop) and city camera. The IRD loop and Autoscope were specified for collecting volume data and Smart sensor HD for volume, speed, and classification data for three weekdays.

- Airport Viaduct freeway on Interstate H-1 had four lanes in each direction, using the Autoscope to collect 24 hours volume data.

- On Urban collectors and industrial highway test sites, five locations were used to test the TIRTL in collecting traffic volume, speed, and classification data in 30 minutes increments for each location to compare with manual observations for volume and classification count and with IRD loop for speed.

- At the Urban Arterial Site location, test of the volume, speed, and classification detection by Autoscope and TIRTL was conducted for seven nonconsecutive hours per one day. The volume and classification detection was compared with manual observations, while the speed detection accuracy was verified by a comparative analysis of the two detectors' data.

The results exhibited that the Smart sensor HD performance in volume counting was inconsistent and made the error ranging from -10.4 percent to 14.8 percent, while overestimating the speed by an average of 7.5 percent and the classification error rate would incread when the volume counting error increased.

Examining the performance of TIRTL under high speed highway traffic indicated that TIRTL successfully detected and classified all heavy vehicles with three or more axles, class six to class 15 according to FHWA axle-based scheme, but, in classifying vehicles of class one to five the error range was 1.1 to 2.6 percent. The researchers speculated that it could have occurred because of the difficulty in distinguishing among several vehicles in these classes by video-based manual observation. TIRTL test on urban arterial indicated that the sensor undercounted volume about 3.3 percent for level lanes and 6.1 percent for sloped lanes, but the average percent errors were increased in classifying vehicles from 10 percent to 42 percent for level and sloped pavements, respectively. However, for volume and speed detection there was no strict requirement for a level pavement surface. Also severe weather and congested flow increases the number of missed vehicle incidents.

The researchers concluded that both volume and classification detection errors shown in Figure 2 reflected an adverse effect of shadow and light as well as the effects of illumination and rainy weather on the accuracy of volume detection by Autoscope on different lanes of a freeway

as shown in Table 12. In spite of the sensitivity of Autoscope to the reduction of illumination, wind, shadow, and weather variations, the detection of speed was less sensitive to these factors, as shown in Table 13 (*22*).

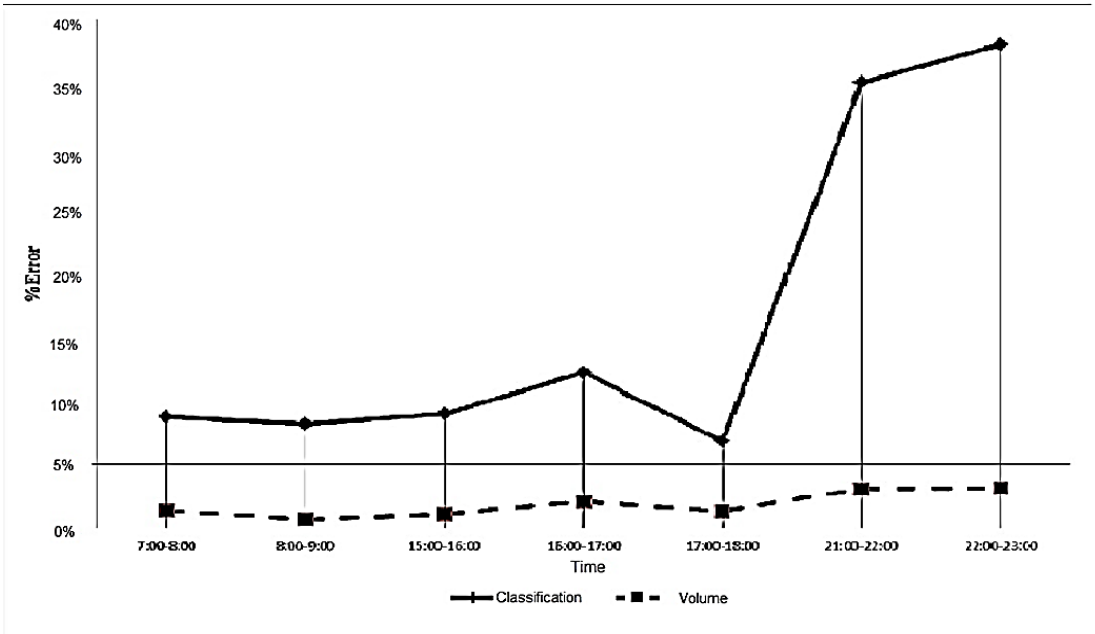


Figure 2. The percentage error of volume and classification detection of Autoscope on urban arterial (22)

Table 12. The Percentage Error of Volume Counts Detection of Autoscope on Freeway (22)

Time	Lane 1	Lane 2	Lane 3	Lane 4
Day (6:00-18:00)	-2.30%	4.90%	10.60%	3.00%
Night (19:00-5:00)	30.10%	40.00%	33.50%	5.90%
Rain (21:00-23:00)	52.80%	64.70%	55.60%	-6.20%

Table 13. Factors Affecting Performance of Autoscope, Smart sensor HD, and TIRTL in Hawaii (22)

Influence factors	Autoscope Rack Vision Terra			SmartSensor HD			TIRTL		
	Class.	Volume	Speed*	Class.	Volume	Speed**	Class.	Volume	Speed***
Illumination	●	●	◑	○	○	○	○	○	○
Shadow	●	◑	○	○	○	○	○	○	○
Rainfall	●	●	◑	○	○	○	◑	◑	◑
Congestion	●	●	●	●	●	●	●	●	◑
Lanes change	●	●	◑	●	●	◑	●	●	◑
Wind	●	◑	◑	○	○	○	○	○	○
Distance of detection area from sensor	○	○	○	●	○	○	○	○	○
Pavement with pronounced crown	○	○	○	○	○	○	●	◑	◑

●Influence factor has a large effect ---- Increase in % error >10%
◑Influence factor has some effect ---- Increase in % error = 5% ≈10%
○ Influence factor has a small effect ---- Increase in % error = 0% ≈5%
* Speed over 8 mph can be detected; ** Speed over 4 mph can be detected;*** Speed over 2 mph can be detected

In 2012, Ravani, et al. evaluated characteristics of the iCone system. The researchers evaluated the accuracy of iCone against handheld LIDAR for traffic speed measurement and against manual traffic counts for traffic volume measurements and the sensitivity to orientation and position of an iCone in collecting traffic data. Three iCones and a LIDAR were deployed on La Rue Rd., a two-way, two-lane in each direction with a wide median near the University of California, Davis, California. For traffic speed and volume measurement tests, average speeds collected from iCones and LIDAR were compared, whereas the manual and iCones traffic counts were compared for traffic volume measurement.

The researchers found that the average speed from the iCone, when close to the LIDAR location, which was close to the traffic approaches, was more accurate than the iCone which was across five lanes from the traffic approach because of the blocking of the iCone from detecting the traffic on the farther lanes by the traffic on the closer lanes as shown in Figure 3.

For traffic volume counting, the comparison of iCones and manual traffic volume data showed that iCones were inaccurate in detecting traffic volume and this was because the radar inside the iCone shuts down between each measuring wipe for 2.25 seconds to avoid duplicate detection for the same vehicle. Two tests were conducted to evaluate the sensitivity of iCones at collecting traffic speeds based on orientation and placement (Cosine Effect). For testing orientation effects on accuracy of an iCone, three iCones were deployed along the parallel line to traffic and set at different angles as shown in Figure 4. Two of the iCones were moved farther from the road for testing position effects as shown in Figure 5. The results of these two tests showed that the iCone speed measurements were not sensitive to their offset position and orientation (*23).*

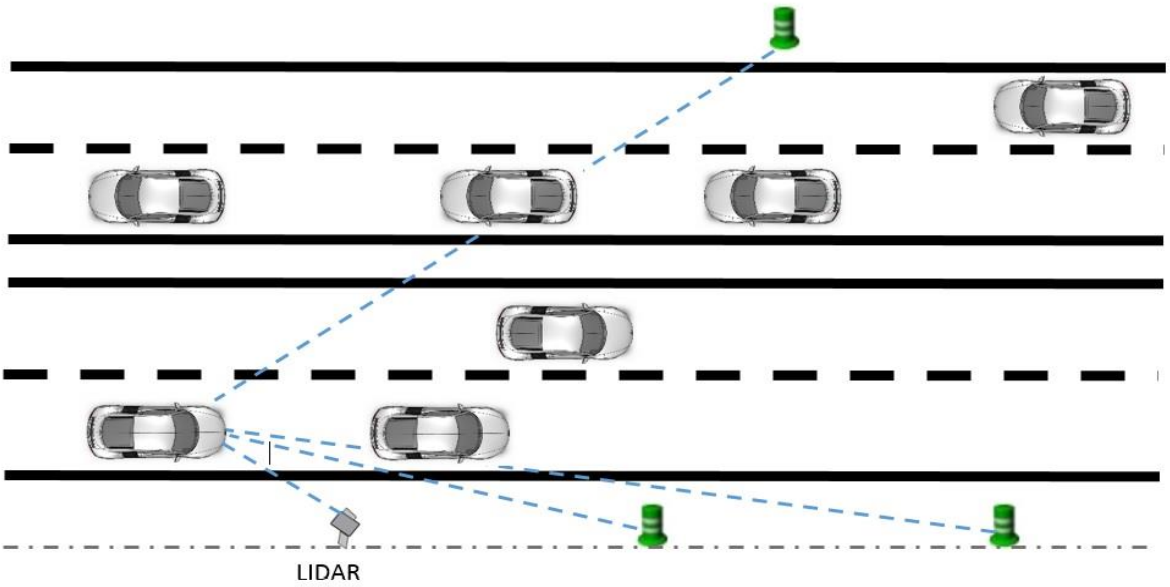


Figure 3. The iCones placements for speed accuracy test (recreated from 23)

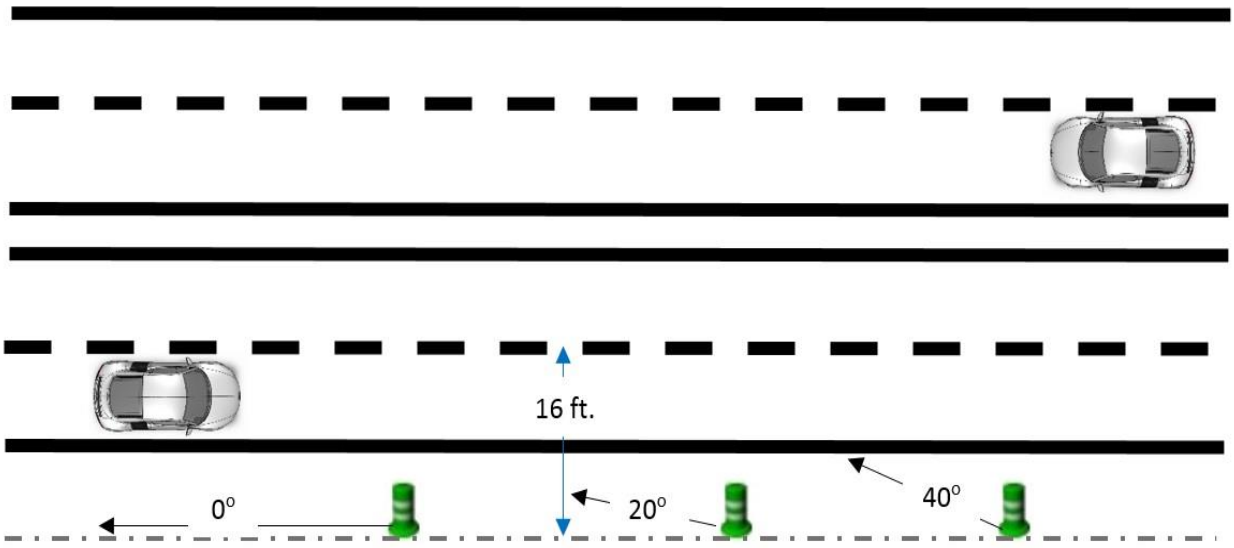


Figure 4. The iCones placement for orientation test (recreated from 23)

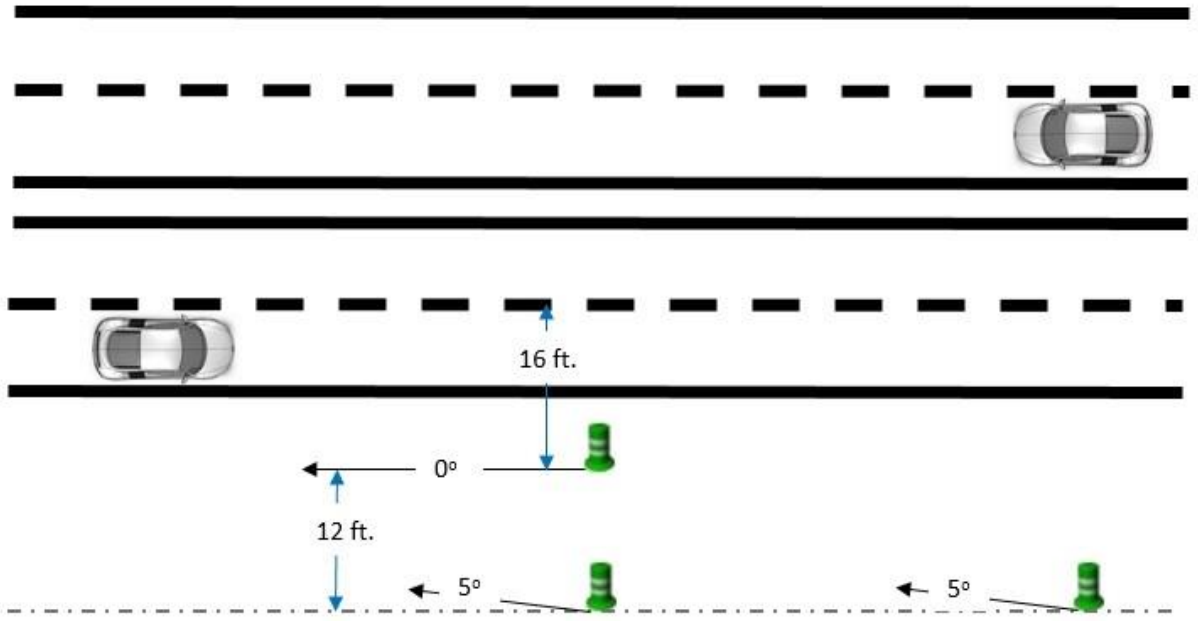


Figure 5. The iCones placements in speed accuracy test (recreated from 23)

Evident from previous research about video detection systems such as Autoscope, it was found that the system required extensive calibration and the user should have configuration knowledge and expertise. In addition to that, providing specific height to set up cameras and

collecting data under optimal illumination were required to obtain better efficiency and accurate data from the system. To address these obstacles, a vehicle detection system based on Harris-Stephen Corner Method (HSCM), which required fewer calibrations and is less sensitive to illumination changes and height, was proposed (*24*). They evaluated the efficiency of the video-based vehicle detection system based on HSCM method for vehicle counting and speed in comparison with Autoscope and manual counts. Eight sets of video feeds were collected in Las Vegas, Nevada in different locations, illumination (recorded during different times of the day), four-lane road dimension, camera view angle, and detected area.

The researchers concluded that the HSCM provided an average speed of 64 mph, while the average speed determined by the Autoscope was 62 mph. In the other words, HSCM provided a better accuracy of speed than Autoscope because the earlier speed test using radar devices indicated that the Autoscope determined speeds 5 mph less than the actual speed. For vehicle counts, the performance of HSCM was better than Autoscope in closer lanes to the camera (lane 1 and lane 2), but the accuracy of vehicle counts for lane 3 and lane 4 degraded significantly because of the skew of the camera field of view, which resulted in counting a vehicle in both lanes (lane 3 and lane 4).

In 2013, Yu and Prevedouros evaluated the accuracy challenges of utilizing portable and non-intrusive traffic sensors for traffic data collection in a variety of traffic and environmental conditions in the urban and rural arterial, highway, and freeway test sites. The study was conducted in and around Honolulu, Hawaii between February 2008 and May 2011. The researchers used the following non-intrusive traffic sensors: Autoscope Rack Vision (Autoscope) with image processing technology (VIP), Infra-red Traffic Logger (TIRTL) with active infrared

technology, Remote Traffic Microwave Sensor (RTMS), Smart Sensor 105 (SS105) and SmartSensor HD (SSHD) with microwave radar technology, and SmarTek's Acoustic Sensor (SAS-1) with passive acoustic technology.

Through comparison of the traffic data from the sensors with manual collected data from video and/or with data produced from other sensor used at the site, the researchers found the accuracy percentages for volume, speed and classification measurements by using those sensing technologies in various traffic and environmental conditions as shown in Table 14.

The accuracy of the VIP technology performance in volume and classification detection was 98 percent and 92 percent in daytime, but this ratio decreased to 82 percent and 64 percent at night. The shadow of roadside structures and tall vehicles were other factors producing false detections beside weather conditions (drops of rain), which impeded the view of the camera in detecting the traffic conditions successfully. Otherwise, speed detection was insensitive to the effects of shadow, light, and weather conditions. The researchers found that the accuracy of vehicle classification by VIP decreased in congested traffic conditions, while volume counting was not affected significantly by traffic flow density. The major challenge in utilizing VIP sensor was fixing cameras at 12 to 15 meters height to produce accurate data because a mounted camera lower than this range created blocking of the entire observation zone by large vehicles. This height not only needed very expensive custom installations but also prevented using VIP sensors in tunnels.

TIRTL, which was the most expensive sensor in the study, provided accurate volume, speed, and vehicle classification data, especially for heavy vehicles under various traffic

conditions. Some passing vehicles were missed or misclassified when slow moving or stopped vehicles under congested traffic blocked the infrared beams used to detect them.

Both models of traffic detectors with microwave radar technologies were tested in this study to detect eight lanes and they provided 90 percent accuracy in volume and 75 percent in classification detections under optimal conditions. They found some double counting and a minor decline in accuracy under congested flow, but no degradation under adverse weather was found.

The passive acoustic sensor provided 97 percent accurate volume counts and 90 percent accurate speed detection, but its performance in vehicle classification accuracy was 61 percent. Both microwave and acoustic sensors required five to eight meters of lateral offset from the nearest lane and so finding locations for mounting units at that distance was not only a challenge but also increased the cost of the detectors (*25*).

Table 14. Summary of Sensor Test Results in Honolulu, Hawaii (25)

No	Sensors Involved	Accuracy			Condition	
		Vol.	Spd.	Cls.	Traffic	Weather
1	Video Image Processing (Autoscope)	98%	94%	92%	Moderate Mixed Traffic (MMT)	Daytime
2	Infrared Laser (TIRTL)	82%	94%	64%	MMT	Nighttime
3	Autoscope	84%	93%	78%	MMT	Shadow
4	Autoscope & TIRTL	75%		58%	MMT	Rainy
5	TIRTL	91%		73%	Heavy Mixed Traffic	Clear
6	TIRTL	93%		87%	Light Mixed Traffic	Clear
7	Autoscope	97%	95%	90%	Morning Peak, Single Divided Lane	Clear
8	Autoscope & TIRTL	98%			24 Hours Counts	Daytime
9	SmartSensor (SS) 105& HD	73%			24 Hours Counts	Nighttime
10	SSHD	92%	94%	96%	MMT	Daytime
11	Autoscope, SS HD	93%	94%	96%	MMT	Nighttime
12	Autoscope	94%		95%	MMT	Rainy
13	Autoscope	91%		97%	Light Mixed Traffic	Clear
14	Autoscope	91%		81%	Heavy, Non-Congested Traffic	Light Rain
15	Autoscope, SSHD	89%		80%	Congested Traffic	Clear
16	Autoscope	93%	95%		Morning Peak, Single Lane	Clear
17	SS HD, Autoscope	87%			24 Hours Counts	Clear
18	SAS-1, RTMS	89%	94%		Heavy, Non-Congested Traffic	Light Rain
19	TIRTL	95%	91%	77%	Heavy, Non-Congested Traffic	Clear
20	Autoscope SSHD	91%		63%	Congested Traffic	Clear
21	RTMS	97%	90%	61%	MMT	Clear

2.3 Summary

Several important considerations were found through the review of the literature. Most of these were related to the type of technology that was evaluated against the popular and proven devices such as loop detectors and PRTs. The key findings of this literature review included:

- Three studies revealed that the iCone was more accurate in detecting traffic speed for the nearest lanes than the farthest lanes because some traffic is visually blocked, reducing the radar's ability to detect the farthest lanes' traffic (*11, 12, 19*). The error in detecting traffic speed for the farthest lanes was 15 mph more than the nearby lanes from the iCone (*11*). The average differences in detected speeds by dual-loop detectors at a three–lane roadway in one direction was three mph (five percent error) lower than speeds detected by the iCones, while the difference in detected speeds from the loop detectors at the closest lane to the iCone was two mph (four percent error) (*12*). The speeds detected by the iCone were not sensitive to its position and orientation, and the iCones were inaccurate in detecting traffic volume (*19*). The results revealed by these studies had a significant impact on the design of the study for this research by showing the need for tests to understand the accuracy of data collect by the iCone.
- The iCone speed and count data sufficiently matched when compared with those data from PRTs on a one-lane ramp and on two-lane undivided highways (*16*). The difference of the speeds measured on the similar section of ramp and highways by the iCone system in comparison to ATIS was less than 10 mph (20). These contradictory results about the accuracy of the iCone indicated a need for more testing to verify its accuracy. These considerations had also an impact on the design of the site selection for this research.

- Marti et al. indicated that the Radar Recorder sensor was most accurate in traffic volume detection by one percent error and Wavetronix SmartSensor HD was the most accurate in classification capability in comparison to other eight traffic detectors versus ATR. In addition, the Radar Recorder and Wavetronix SmartSensor HD were the most accurate sensors for speed detecting with a 1.2 percent error (*14*). This consideration had an impact on the evaluation of the new traffic detectors, as well as the study design used for this research.
- Bellucci and Cipriani indicated that devices adopting multiple technologies, generally, and double technology systems, specifically, had better accuracies in traffic counting and reliability than devices using a single technology (*13*).
- According to Gates et al., the five common portable speed measurement detectors performed equally well for the 35-mph trails, while Lidar and radar were the most accurate devices for the 55-mph trails (*15*).
- Jasrotia established the effects of tested devices on the driver response and found that vehicle speeds were reduced when the Lidar gun or Autoscope with trailer was visible on the roadside, while increased speeds were observed when the Smart Sensor was installed (*17*).
- According to Fitzsimmons et al., PRTs were found to be accurate in capturing vehicle lateral position at vehicle speed ranging from 19 to 51 mph for both day and night (*18*).
- Yu et al. indicated that the accuracy of tested sensors were effected by different influence factors such as weather, illumination, traffic congestion, location of sensors from detection area, and crown slope of pavement. The traffic classification capability of Autoscope and TIRTL was adequate at ideal conditions, but SmartSensor HD was inadequate (*21*).
- The SmartSensor HD performance in volume detection was found to have an error range from -10.4 percent to 14.8 percent and overestimated the speed by 7.5 percent. The volume

detected by TIRTL was undercounted about 3.3 to 6.1 percent depending on the slope of the pavement, while the error in volume detected by Autoscope was less than four percent (*22*).

- The traffic detectors with microwave radar technologies provided 90 percent accuracy in volume and 75 percent in classification detection on eight lanes of traffic under optimal conditions (23).
- Chintalacheruvu and Muthukumar indicated that the HSCM provided better accuracy in traffic speed and counting detection than Autoscope (*24*).
- Mallikarjuna et al. revealed the capability of a TRAZER system in collecting traffic data under highly congested traffic conditions (*25*).

The information from the literature reported herein was useful in developing the study design in selecting devices for this study, which is presented in Chapter 3. The information was also used as a baseline to study the iCone, which is presented in Chapter 4.

CHAPTER 3. METHODOLOGY

In this research, the objective was to develop a method of studying various devices and determine the accuracy of each device in collecting speed and volume data by comparison with the control device and the variation in speed due to their presence. The chapter is divided into three sections. The first section discusses speed and volume measurement devices that were tested. The second section discusses test site selection criteria. The third section discusses test conditions required and the last section describes the statistical methods used to analyze data.

3.1 Speed and Volume Measurement Devices

Four data collection devices were used to measure the speed and volume of traffic. The PRTs were used as a control device to evaluate the effectiveness of other traffic detectors because of their ability to collect accurate traffic data such as speed, volume, vehicle classification, and the time of day associated with each data sample.

The devices included:

- PRTs;
- Wavetronix SmartSensor HD;
- Radar Recorder; and
- iCone.

3.2 Test Site Selection

Selecting the right test site was critical to the success of the study involving field implementation and tests. Therefore, site selection criteria were precisely developed. The technical side of site selection included: appropriate geometric configuration to get accurate data based on information gathered from the literature review and device manufacturers' manuals and recommendations, traffic condition, and sensor locations.

A two-lane rural highway was selected for this study to simplify the data collection. Many factors could affect the targeted data so the selected site criteria was required to be a two-lane rural highway with a posted speed limit of 55 mph and the site must be away from traffic signals, work zones, curves, parking areas, and crosswalks. In addition, the selected site was required to have shoulders and existing poles to deploy the devices such as the Radar Recorder, which mount on the fixed poles. The researcher consequently selected a one–half mile section, of US 24/40, near the Lawrence Municipal Airport, between E 1500 Rd. and E 1600 Rd., as shown in Figure 6.

Figure 6. US 24/40, Near the Lawrence Municipal Airport

3.3 Test Conditions

In the methodology of data collection, the following factors were considered:

- The data were collected during various times of typical weekdays, Tuesdays, Wednesdays, and Thursdays.

- Weather conditions: weather conditions such as a heavy precipitation, strong wind, and low temperature have an impact on the detection technologies and on driving performance. Therefore, inclement weather was avoided during the data collection.

- Construction and geometric factors: construction and geometric factors can affect the performance of detectors and reduce detection accuracy. It could also hamper the installation of particular detectors on the targeted position on the roadway. Based on these, a two-lane rural highway section away from traffic signals, work zones, curves, parking zones, and crosswalks was selected for this study. Sufficient shoulder width and fixed poles were also necessary elements along the selected segment.

3.4 Statistical Method

The statistical analysis, which applied to the collected data, included testing some hypotheses. To evaluate the accuracy of the devices in collecting traffic speed and volume data against PRTs, two hypotheses should be tested in two consecutive stages. The first stage included testing the hypothesis that the difference between the data collected for each interval measured by PRTs would be equal for all respective devices through applying F-test. If the null hypothesis at the first stage was rejected, the second stage was used to determine which one (or more) of the

devices was similar to the PRTs through applying paired t-tests. The results of this stage could conclude the error ratio of each device in detecting traffic speed and volume in comparison to the data detected by PRTs. The hypotheses for both stages to evaluate the accuracy of devices in collecting traffic speed, which are similar for the traffic volume, are shown below:

- The null and alternative hypothesis for the first stage

H_o: $\Delta\mu_{si} = \Delta\mu_{sj} = \Delta\mu_{sk}$

$H_{a:}$ At least one of them not equal

Where: $\Delta\mu_s$ = (average of mean speed $_{PRTs}$ - average of mean speed $_{Device}$);

i = iCone;

j = Radar Recorder; and

k = Wavetronix SmartSensor HD.

- The null and alternative hypothesis for the second stage

Ho: $\mu_s = \mu_{si}$ Ha: $\mu_s \neq \mu_{si}$

Ho: $\mu_s = \mu_{sj}$ Ha: $\mu_s \neq \mu_{sj}$

Ho: $\mu_s = \mu_{sk}$ Ha: $\mu_s \neq \mu_{sk}$

Where: μ_s = average of mean speed PRTs;

i = iCone;

j = Radar Recorder; and

k = Wavetronix SmartSensor HD.

Regarding the effects of the devices on driver behavior, the tested hypotheses were split into two stages, as shown below. The first stage was to test the null hypothesis that the difference in the speed as detected by PRTs at the upstream and downstream locations were the same for two conditions through applying the F-test. The first condition was for each traffic lane and light condition (day, sunset, night, and sunrise) and the second one was for each deployed device and light condition. If the tested hypothesis at the first stage was rejected, in the second stage the t-test would be applied on speed data at the upstream and downstream locations when each device was deployed beside the PRTs. The results of the second stage would show which devices had the same effect on driver behavior as the effect of PRTs.

- The null and alternative hypothesis for the first stage

  First condition:

  H_o: $\Delta S_p = \Delta S_i = \Delta S_j = \Delta S_k$ (for each traffic lane and all light conditions)

  H_a: At least one of them not equal to ΔS_p

  Second condition:

  H_o: $\Delta S_p = \Delta S_i = \Delta S_j = \Delta S_k$ (for each deployed device and all light conditions)

  H_a: At least one of them not equal to ΔS_p

  Where: ΔS = difference speeds at upstream and downstream as recorded by PRTs;

  p = PRTs only;

i = iCone;

j = Radar Recorder; and

k = Wavetronix SmartSensor HD.

- The null and alternative hypothesis for the second stage

H_o: $\Delta S_p = \Delta S_i$

H_a: $\Delta S_p \neq \Delta S_i$

H_o: $\Delta S_p = \Delta S_j$

H_a: $\Delta S_p \neq \Delta S_j$

H_o: $\Delta S_p = \Delta S_k$

H_a: $\Delta S_p \neq \Delta S_k$

CHAPTER 4. FAMILIARITY WITH DEVICES

The Wavetronix SmartSensor HD, Radar Recorder, and iCone were selected to test their accuracy against PRTs based on the technology they depend on, the radar technology, to collect traffic data. Even though they use same detection technology, each of the devices is deployed on the roadside in different ways. According to the literature, contradictory results had been reported regarding the accuracy of the iCone. Therefore, determining a separate chapter to identify the devices were used in this study became absolutely necessary.

4.1 Familiarity with PRTs

The PRTs was invented in the 1920s as the first intrusive detector technology (*26*). Many studies were conducted with this device and its accuracy in collecting traffic data was proven. PRT sensor is a portable device, using lead-acid, gel, or other rechargeable batteries as a power source. The road tubes are installed perpendicular to the traffic flow direction and sends a burst of air pressure along a rubber tube when tires of a vehicle pass over the tube. The pressure pulse closes an air switch to produce an electrical signal, which sends it to a counter for analysis of passing vehicles information such as speed, and vehicle classification by axle count and spacing (*27*).

Advantage: Road tube sensors are quick to install, have a less power usage, and are a low-priced device. Road tube sensors are portable, low cost and simple to maintain. Also, sensor manufacturers supply software packages to assist with data analysis (*27*).

Disadvantage: Because it is an intrusive device, placing PRTs on heavy traffic volume roadways is difficult, unsafe, and causes some disruption of traffic flow. Also, its performance in collecting

accurate data is influenced by roadway geometry and adverse weather conditions (*26*). Inaccurate axle counting occurs when truck and bus volumes are high and multi-axle trucks are sometimes counted as two vehicles and it can misread a vehicle at low speed and when it stops on the tubes or changes its speed within the tube space. The road tubes may move as vehicles cross and are prone to become loose and tear (*7*). Another disadvantage is securing road tubes on the road in a cold weather where lack of adhesion between mastic tape and the pavement created an obstacle for collecting data in winter.

4.2 Familiarity with Wavetronix Smartsensor HD

The Wavetronix SmartSensor HD system was provided for this study by the Kansas department of transportation (KDOT). A professional group from KDOT installed this device in such a way that it could collect accurate traffic data. The Wavetronix SmartSensor HD system is a non-intrusive portable pole-mounted side-fire microwave radar sensor that provides vehicle speeds, counts and other parameters, which is mounted on a moveable mast arm on a heavy-duty trailer, as shown in Figure 7. The trailer contains a set of batteries, two solar cell boards to provide the Wavetronix with electric power and recharge batteries, a hard disk and internet system fixed in a cabinet. The Wavetronix mounts on the post attached to the trailer and raised up to a desirable height and the internet set within the cabinet connects to the laptop to help locate the proper orientation of the Wavetronix to input the geometric information of a road to the system. The Wavetronix performance could be monitored online by any computer device connected to the internet after downloading a software provided by the manufacturer.

Figure 7. Wavetronix SmartSensor HD

Advantage: Wavetronix is a non-intrusive portable system, which collects traffic data. The system can be used to collect lane occupancy, volume, speed, gap, headway, and vehicle lane position and monitors multiple lanes for different time intervals (*28*).

Disadvantage: the sensitivity of its orientation and height impacts the accuracy of collected data. The system requires extensive calibration and installation work, which makes it less suitable for temporary data collection. Costs include routine maintenance, housing, support pole, and providing a level and hard surface spot to install the trailer.

4.3 Familiarity with Radar Recorder

According to the literature, the Radar Recorder is an accurate device in collection traffic data. It is a type of microwave vehicle detector, which transmits electromagnetic energy from an antenna towards vehicles traveling the roadway. When a vehicle passes through the antenna beam, a portion of the transmitted energy is reflected back towards the antenna, the energy then enters a receiver where the detection is made, and traffic flow data are calculated (*29*). The Radar Recorder was designed to be installed along the roadway up to 80 feet from the far lane of traffic and installed at a 45 degree angle to the roadway using the provided mounting bracket to collect accurate volume, speed, length, and gap data (*14*).

Advantage: It is a portable non-intrusive light device housed in a waterproof case and powered by a rechargeable battery. The radar recorder collects continuous traffic data like volume, speed, and length for months. Collected data are downloaded by direct cable connection or by wireless Bluetooth technology or cell phones (*30*).

Disadvantage: It is a pole mounted radar sensor, as shown in Figure 8, with detection range up to 100 feet. The radar recorder must be configured in the targeted field with a laptop and that process can be time consuming. Because each battery can be deployed for seven days, a second battery should be added for two weeks of data collection. Even though it is a non-intrusive technology, on site personnel must enter the roadway to determine the distance to configure the radar. It is relatively more expensive in comparison to the pneumatic road tube sensor (*14*).

Figure 8. Radar Recorder

4.4 Familiarity with iCone

The iCone is a relatively new portable traffic monitoring ITS devices, which is a battery-powered Doppler radar sensor contained in a road construction traffic barrel with all its other components, such as GPS antenna, Iridium modem, Iridium antenna, and SI solutions controller board, as shown in Figure 9. It can be utilized for various traffic-monitoring functions such as determining speed, vehicle count, and queue length when deployed on the roadside. Because of its portability along the road, it can be used in work zones as well (*31*).

The iCone, which completed its third generation of field testing with the New York State Department of Transportation (NYSDOT) in the fall of 2008, has networking capability to transmit real-time traffic information over the Internet to a central web site. To identify the accuracy of this device and examine the quality of data collected by iCones, it has been under

evaluation by seven state departments of transportation (*32*). The FHWA accepted the iCone to be a crashworthy traffic control device in 2008 (*11*).

Figure 9. Inside and outside view of an iCone (19).

Advantages: an iCone is a portable device that can be deployed on the roadside to collect and aggregate basic real-time traffic parameters like average speed, volume, queue length, and position coordination (*16*). The rechargeable battery power enables the iCone to operate as an autonomous device weeks without recharging (*32*).

Disadvantages: Recharging an iCone means transporting it to a charging location and the battery requires approximately 4 hours to be fully charged. Additionally, since it looks like a traditional traffic barrel, contractors in work zones have been reported to inadvertently move it. It has been reported to have accuracy issues when collecting data on more than one lane of traffic in the same direction (*16*). The iCone is sensitive to orientation and position on the roadside because

both orientation and position of an iCone can affect the severity of the Cosine Effect (*19*). The iCone unit weighs 60 pounds and needs to be loaded at least by two people onto a truck to be transported to the site locations (*20*).

Regarding its accuracy in collecting traffic data, some literature indicated contradictory results. Therefore, the researcher conducted tests in different environments to determine the best location and orientation of iCone on the roadside to collect accurate data by this device.

4.4.1 Urban Environments

Several sites with different traffic and geometric features were selected to understand the mechanism of the iCone operation. Tests were conducted at the following sites:

East lot at KU West campus;

23rd Street;

15th Street;

Naismith Drive; and

Kentucky Street and Tennessee Street.

The tests on these locations were implemented for exact purposes and by following specific procedures, as shown below:

4.4.1.1 East lot at KU West campus

In order to understand how iCone collects speed and count data on traffic segments and evaluate the precision of data collected by the iCone in comparison to PRTs, a closed course test was

conducted on May 11, 2014. The selected section to perform the test was the East Lot of Park and Ride facilities at the University of Kansas. In 755 ft in the southern part of the east lot, two lane of channelizing devices (traffic Cones) were fixed (50ft apart) as shown in Figure 10. This section was required to reach the specific speed zone 350 ft from the start point to accelerate the speed. Before the iCone by 250 ft two temporary signs were used also, one at the start point of the test path and the other 350 ft from the start point.

Figure 6. Closed-Course Test Layout

PRTs were placed next to the iCone 8 feet apart from each other. Edge line of the path was established by mastic tape. The iCone was stationed six ft. from the edge of the tubes, 12 ft. from the center of the path, and directed towards oncoming traffic flow, as shown in Figure 11. Three vehicles of different types (minivan, sedan, and motorcycle) were chosen to collect data by this procedure; each vehicle completing 30 test runs, 17 tries with speed range 20-25 mph and 16 at 30-35 mph (see Appendix A). All tests were done on the lane nearer to the iCone.

Figure 7. iCone test setup

The duration between each test run was approximately 75 seconds. The experiment was recorded by two cameras to check the count data. It was found that the detected speed by iCone was less than pneumatic road tube by 1.03 mph and 1.06 mph for the first and second speed ranges, respectively. The iCone counted vehicles more than pneumatic road tube by 24 vehicles and 12 vehicles for the first and second speed range, respectively, as shown in the Table 15.

Table 15. The Results of East Lot at KU West Campus Experiment

iCone		PRTs		Results			
Count (veh.)	Avg. Speed (mph)	Speed (mph)	Count (veh.)	Error in Counting (veh.)	Error in Counting (%)	Different in Speed (mph)	Different in Speed (%)
75	22.26	23.29	51	24	47	1.03	-4.46
60	31.79	32.85	48	12	25	1.06	-3.23

4.4.1.2 23rd Street

To evaluate the accuracy of the iCone data collection for long queue lengths, a test was conducted on June 11, 2014 for the eastbound approach at the intersection of 23rd and Iowa street, Lawrence, Kansas, as shown in Figure 12. The equipment was set up near the intersection of 23rd and Iowa street.

Figure 8. 23rd iCone test setup

The iCone was placed on the median 350 feet from the intersection at Clinton parkway and Crestline drive facing the oncoming eastbound traffic. A total of three cameras were stationed on either side of the intersection at Clinton Parkway and Crestline Drive to capture the queue lengths and real time vehicular volumes during the study hour. The data were collected for

the evening peak hour from 5 p.m. to 6 p.m. The device performed as expected for the intersection and interesting conclusions were made from the test. There was no consistent trend in speed, the highest observed average speed was 41.4 mph, and the lowest was 7 mph. The total average speed for the entire study hour was 23.6 mph.

Traffic flow characteristics are shown in Figure 13. If speeds of 15 mph to 35 mph were considered as upper and lower limits, from the graph it was observed that there were 13 data points that acted as outliers. The six data points above the highest average speed range of 35 mph suggested that the green phase was active and the queue was being cleared. Higher average speeds indicated that the vehicles were moving swiftly and there was no queue formation during that period. On the other hand, the seven data points that fell below the minimum average speeds suggested that the traffic signal's red phase was active and a long queue was being formed at the intersection. All the other data points in the range of 15 mph to 35 mph suggest steady but slow movement of vehicles at the intersection.

The data points that fell in the speed range mentioned gave a precise insight of the situation that existed at the intersection at a particular time. For example, from the graph at 5:25 p.m. the red phase was in progress at the intersection of 23rd and Iowa, which slowed the vehicles resulting in lower average speeds. On the other hand, at 5:27 p.m. when the green phase was active, vehicles began moving more swiftly resulting in higher average speed which is evident from the graph. Thus, the graph was an excellent indicator of the conditions that existed at the intersection.

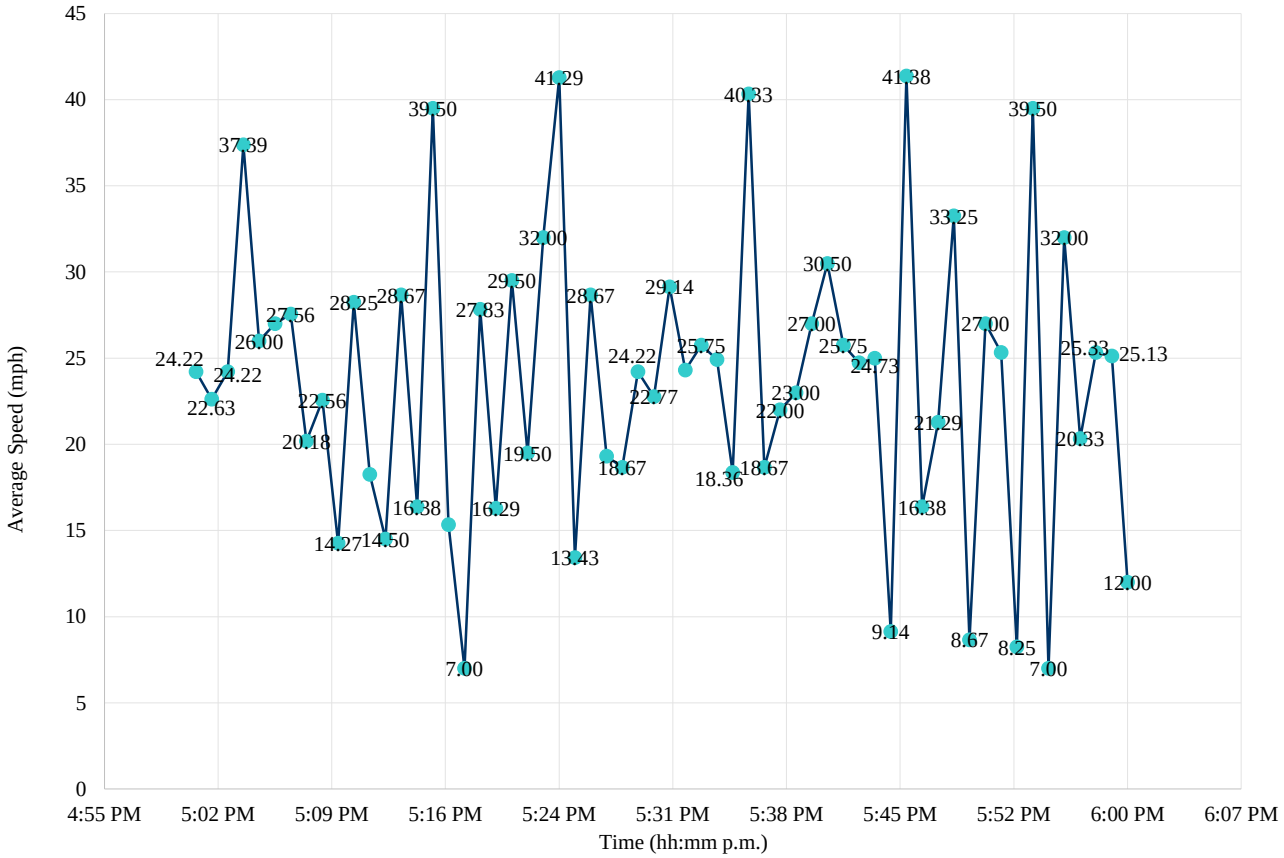


Figure 9. Variations of average speeds with time during the study hour

4.4.1.3 15th Street

The field study was conducted to evaluate accuracy of the iCone data collection for oncoming traffic and traffic moving away on vertical curves. Two iCones along with two video cameras were set up for data collection on June 18, 2014 at the vertical curve of the two-lane two-way road before the intersection of the 15th street and Engel Rd in Lawrence, KS. One iCone was facing the oncoming traffic, while the second was set up in such a manner that traffic was moving away from it. Traffic volume data were collected for 15-minute intervals from 9:30 a.m. to 10:30 a.m. for both iCones at the two locations.

For each data collection interval, both iCones were oriented in different directions. The goal of the experiment was to verify whether an iCone collects data for vehicles moving away from it and find out the best orientation for an iCone to collect data for the desired traffic lane. From the data, it was observed that the iCone in the peak of the vertical curve with parallel orientation was more accurate than the other location. The other observation, that was noted in this experiment, is that data were being collected for 10 minutes even after the iCone was deactivated. The iCone did collect data for the vehicles not only coming on but also moving away from it. Even though the accuracy of counting vehicle was changed dramatically with the locations and orientations, the iCones collected data for all the three orientations and it was not necessary that the iCone be facing the oncoming traffic for collecting data, as shown in Table 16. Since both iCones had varying results, no specific recommendations were made regarding the vertical curve locations.

Table 16. The Result of 15th Street Experiment in Lawrence, KS

Location	Incoming[1] (veh/or.*)	Outgoing[2] (veh/or)	Total Video volume (veh/or)	iCone Count (veh/or)	Volume Error (%)	Orientation
On the crest	46	75	121	129	6.61%	parallel[3]
	59	116	175	160	-8.57%	30° toward[4]
	68	88	156	83	-46.79%	30° away[5]
On the sag	48	101	149	202	35.57%	parallel
	65	93	158	203	28.48%	30° toward
	28	36	64	77	20.31%	30° away

[*] Orientation
[1] Vehicles coming toward the iCone location.
[2] Vehicles going away from the iCone location.
[3] The arrow on the top on the iCone directed parallel to the adjacent traffic lane.
[4] The arrow on the top on the iCone directed 30° into the adjacent traffic lane.
[5] The arrow on the top on the iCone directed 30° away from the adjacent traffic lane.

4.4.1.4 Naismith Drive

Two iCones were set up for collecting data on June 24, 2014 near Allen Field House on the KU campus. The goal of this study was to examine accuracy of its traffic counting ability for oncoming and outgoing traffic. iCone 1 was placed to collect data on the southbound approach near Allen Field House facing north and iCone 2 was located on the middle of 18 ft. wide median facing the oncoming southbound traffic near Naismith Hall, as shown in Figure 14.

Figure 10. Naismith Drive iCone setup

During the test duration, iCone 1 was oriented in two different directions (parallel to the adjacent traffic lane and 30 degrees away from the adjacent traffic lane) to find the best possible direction in which the iCone should be pointing to ensure optimal data collection. iCone 2 collected data for three different orientations. The iCones were turned off before restarting data

collection each time the direction was changed and was kept in the off mode for the next 20 minutes before beginning the next process of data collection to ensure separation in the data sets. Both iCones were situated at a distance of approximately 450 feet from each other to avoid interference from the radar units.

From the video data and the data collected by the iCones, as shown in Table 17, it was found that iCone 1, which was oriented parallel to the adjacent traffic lane, had collected data for over 20 minutes for more than just the two traffic lanes adjacent to itself. Specifically, the iCone, which was oriented 30 degrees away from the adjacent traffic lane yet, collected data for more than just one traffic lane. The probable causes for this higher number of readings could be pedestrians or vehicles interrupting the transmission of the signal while the iCone was oriented 30 degrees away from the adjacent traffic lane. It was evident from the data that the system was inaccurate when the device was oriented 30 degrees away from the traffic lane. The data collected by the iCone 2 was consistently higher than the data obtained from the video. This may be a result of the pedestrians and bicyclists who used the sidewalks or because of the wide median, which weakened the ability of radar to detect vehicles in the farther lanes.

Table 17. The Results of Naismith Street Experiment in Lawrence, KS

Location	Incoming (veh/or.)	Outgoing (veh./or)	Total Video volume (veh/or)	Volume Error (%)	iCone Counting (veh/or)	Orientation
iCone 1	114	75	189	-36	121	parallel
	93	87	180	-61.7	69	30^o toward
	88	120	208	-87	27	30^o away
iCone 2	69	104	173	30	225	parallel
	106	108	214	4.2	223	30^o toward
	114	86	200	11	222	30^o away

4.4.1.5 Kentucky Street and Tennessee Street

The iCones were tested for accuracy of their data collection for oncoming and outgoing traffic volume on two one–way streets on July 8, 2014. The iCones were set up to collect data on Tennessee St. and Kentucky St. in downtown Lawrence, as shown in Figure 15. During the test duration, the iCones were oriented in four different directions (30 degrees away from the adjacent traffic lane, parallel to the adjacent traffic lane, 30 degrees towards the adjacent traffic lane, and perpendicular to the adjacent traffic lane) to find out the best possible direction in which the iCone should be pointing to ensure precise data collection.

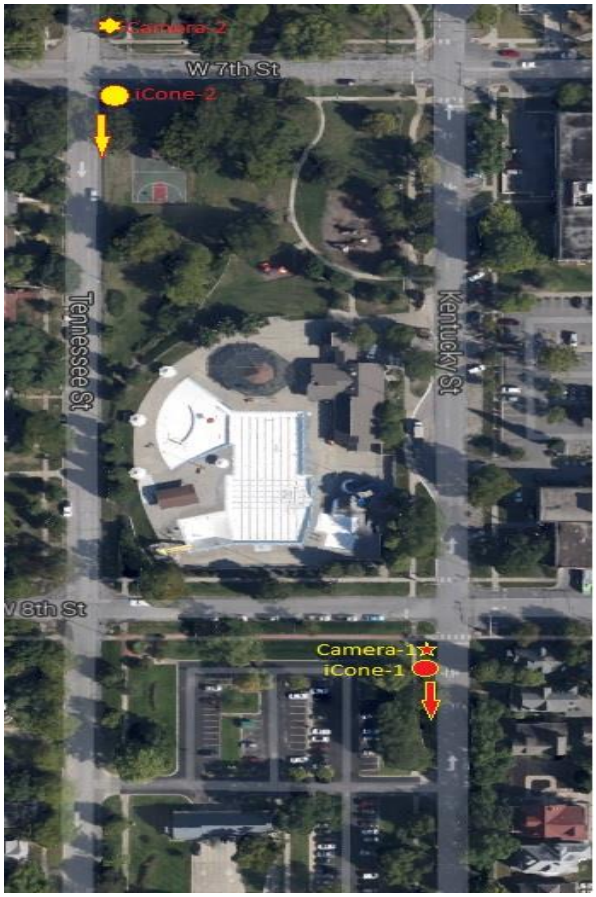


Figure 11. Layout for Kentucky St. and Tennessee St. iCone setup

The iCones were deactivated before restarting data collection each time the direction was changed. After analyzing the data, as shown in Table 18, it was observed that both iCones that focused on upstream traffic on Kentucky Street and that focused on downstream traffic moving away from the iCone on Tennessee Street produced more accurate data when they were parallel to the traffic flow than the other directions.

Table 18. The Result of Kentucky and Tennessee St. Experiment in Lawrence, KS

Location	Right[1] (veh/or)	Left[2] (veh/or)	Total volume (veh/or)	iCone (veh/or)	Volume Error (%)	Orientation
Kentucky St.	145	77	222	239	+7.7	Parallel
	138	66	204	220	+7.8	30^{o} toward
	98	56	154	140	-9.1	30^{o} away
	128	84	212	151	-28.8	Perpendicular[3]
Tennessee St.	132	134	266	278	+4.5	Parallel
	110	130	240	196	-18.3	30^{o} toward
	99	111	210	118	-43.8	30^{o} away
	141	132	273	184	-32.6	Perpendicular

[1&2]The vehicles on the right and left lanes respectively.
[3] The arrow on the top on the iCone directed perpendicular to the adjacent traffic lane.

4.4.2 Rural Settings

On July 22, 2014, two iCones were used to test the accuracy of traffic volume data collection for oncoming and outgoing traffic on US 24 (two-lane, two-way rural highway with a posted speed limit of 65 mph) near Williamstown, KS. Both iCones were located 450 feet from each other to avoid interference in data collection. During the test duration, the first iCone (iCone 1) was oriented parallel to the adjacent traffic lane for the entire duration of the test and the second iCone (iCone 2) was oriented in two different directions: 30 degrees toward traffic flow and 30 degrees away from traffic flow, to obtain two different data sets. The data from both iCones were then compared with each other to identify possible flaws in data collection and accuracy of data. Inferred from the data that the iCone oriented 30 degrees either toward or away from a traffic flow direction missed more than 13 percent of the vehicles, while on parallel orientation it counted 6-13 percent of vehicles twice, as shown in Table 19.

Table 19.The Result of Rural Highway Experiment in Williamstown, KS

iCone	Incoming (veh/or)	Outgoing (veh/or)	Total Video volume (veh/or)	iCone Counting (veh/or)	Volume Error (%)	Orientation	Avg. Speed (mph)
iCone 1	60	82	142	161	+13.38%	parallel	60.3
iCone 2	60	82	142	123	-13.38%	30 toward	54.5
iCone 1	81	119	200	213	+6.50%	parallel	61.4
iCone 2	81	119	200	166	-17.00%	30 away	58.1

4.4.3 Work Zone Environments

After several preliminary tests in urban and rural locations, the iCones were evaluated for collecting traffic volume data in various work zones with different geometric and topographic characteristics. For four weeks, from August 5 to August 28, 2014, the iCones were used in four

different work zones with portable traffic signals. Three days in each week, (Tuesday, Wednesday, and Thursday) during the experiment period, two iCones used to collect traffic volume data and compared against data collected with cameras. The parallel orientation was selected as the best orientation to count vehicles. The work zones were:

- US 56 near Burlingame and Scranton;
- US 31 inside and near Melvern;
- US 24 inside and near Beloit; and
- US 50 near Newton.

The four test locations, which were listed above and shown in Figure 16, were essentially two-lane, two-way rural highways with a posted speed limit ranging from 55 mph to 65 mph and near an ongoing work zone. In some cases due to movement of the work zones, the iCones had to be placed closer to a town resulting in lower overall average speeds, but that did not alter the data collection procedure.

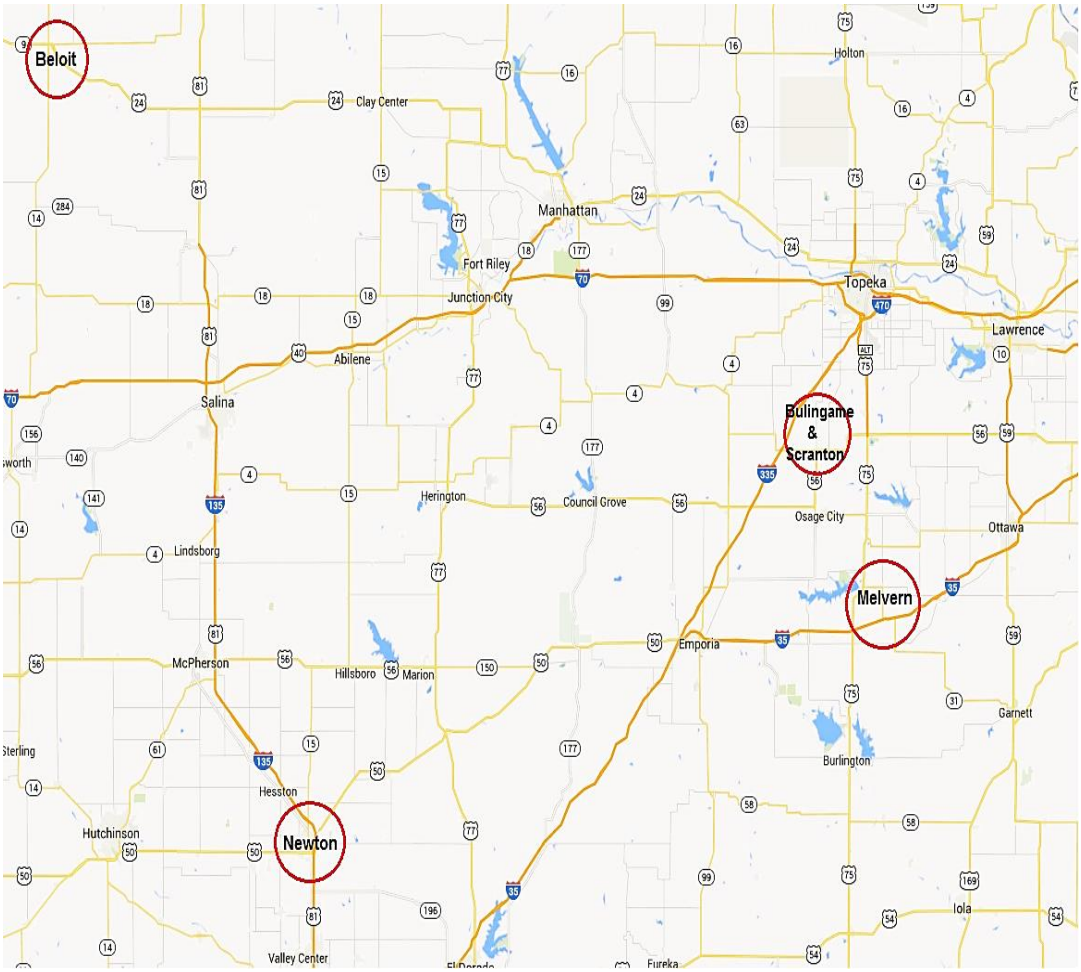


Figure 12. Tests in cities where work zones existed

Based on the results of the preliminary testing, the two iCones were oriented parallel to the adjacent traffic lanes and collected data for both directions of traffic. One iCone was used on either side of the work zone approximately 0.25 mile upstream from the location of the flagger station. The data from the iCone were then compared to the video data to determine the percentage error and overall accuracy, for more details, see Appendix A. The results, as shown in Table 20, Table 21, and Figure 17, demonstrated that the iCones detection ability in collecting traffic count data was affected by the geometric design and the topography of the roads, while in the two-lane two-way, level road sections the iCones were more accurate in comparison to other sections, as shown in Figure 18.

Table 20. Results from Data Reduction for Work Zones

Date	Location* Code	iCone Count		Video Count			Count Error (%)
		Site	Count (veh/day)	Incoming (veh/day)	Outgoing (veh/day)	Total (veh/day)	
8/5/2014	1	Burlingame	209	93	92	185	13
8/6/2014	2	Scranton	573	191	181	372	54
8/7/2014	3	Scranton	1103	413	262	675	63.4
8/12/2014	4	Melvern	100	27	23	50	100
8/12/2014	5	Melvern	425	79	162	241	76.4
8/13/2014	6	Melvern	943	215	214	429	119.8
8/13/2014	7	Melvern	174	70	62	132	31.8
8/14/2014	8	Melvern	229	115	84	199	15.1
8/19/2014	9	Beloit	1135	519	527	1046	8.51
8/20/2014	10	Beloit	1302	354	290	644	102.2
8/20/2014	11	Beloit	1139	484	598	1082	5.3
8/21/2014	12	Beloit	1713	547	517	1064	61
8/21/2014	13	Beloit	1059	397	415	812	30.4
8/26/2014	14	Newton	1511	759	784	1543	99.1
8/27/2014	15	Newton	3567	2037	2091	4128	75.1
8/27/2014	16	Newton	2620	1361	1279	2640	92.5

*See Table 21.

Table 21. Description of Locations of iCone in Work Zones

Location Code	No. of Lanes	Slope	Location	Shoulder	Deployment
1	2	Level	Rural	0	On a two-way level rural highway segment close to travelled lane.
2	2	Slight-Vertical	Rural	0	On a two-way slight vertical curve rural road segment close to travelled lane.
3	2	Horizontal	Rural	0	On a two-way horizontal curve road segment close to travelled lane.
4	2	Sharp-Vertical	Rural	0	On a two-way sharp vertical curve rural highway segment close to travelled lane.
5	2	Level	Urban	2'	Close to an intersection, on a two-way level road segment at 6' far from the travelled lane.
6	2	Slight-Vertical	Urban	2'	Close to an intersection, on a two-way road segment at 6' far from the travelled lane.
7	2	Sharp-Vertical	Rural	0	On a two-way sharp vertical curve rural highway segment close to travelled lane.
8	2	Level	Rural	0	In a side ditch on a two-way level road segment close to travelled lane.
9	2	Level	Urban	6'	Near an intersection on a two-way level road segment close to travelled lane.
10	2	Level	Urban	6'	On a two-way level road segment at 6' far from the travelled lane.
11	2	Level	Urban	6'	Near an intersection on a two-way level road segment close to travelled lane.
12	2	Level	Rural	6'	On a two-way level road segment at 6' far from the travelled lane.
13	2	Sharp-Vertical	Rural	2	On a on a two-way vertical curve road segment at 4' far from the travelled lane.
14	2	Level	Rural	6'	On a two-way level road segment at 6' far from the travelled lane.
15	4	Level	Rural	6'	On the bridge's shoulder of level road segment with a wide median.
16	2	Level	Rural	6'	On a two-way level road at 6' far from the travelled lane.

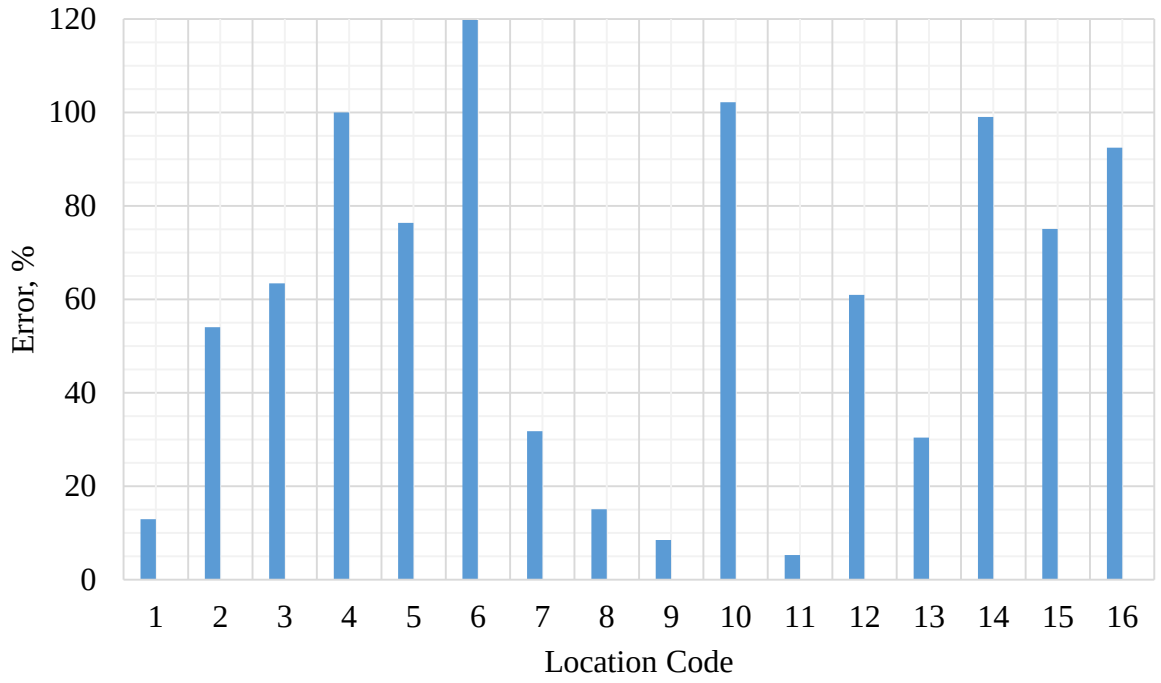


Figure 13. Counting Errors of iCone in Work Zones

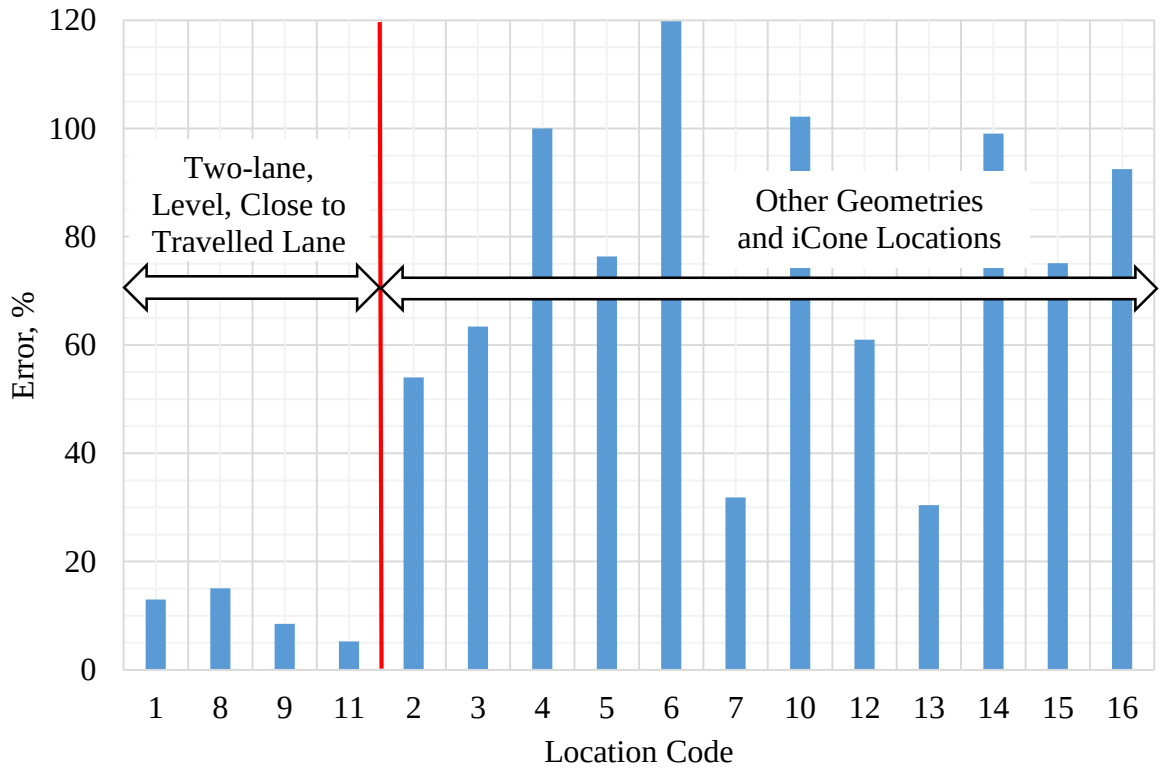


Figure 14. Counting Errors of iCone in Different Geometry and iCone Locations Segments

It was evident from the results for all the test locations that highway geometrics and topographical factors resulted in inaccurate results. In conclusion, the iCone's accuracy of collecting vehicular count data was affected by: orientation of the iCone, highway geometrics, and site topography.

The researcher believe that the best location to use the iCone for collecting vehicular count data would be a two-way, two-lane level road with clear sight distances. This recommendation was used as a base for finding appropriate locations in order to conduct the comparison study mentioned in Chapter 3.

CHAPTER 5. DATA COLLECTION

The objective of the field data collection with multiple devices was to measure the speed and volume of traffic using PRTs, iCone, Radar Recorder, and Wavetronix SmartSensor HD devices and the response of drivers toward the existence of these devices on the road. These data were then compared with the control traffic data collected by the PRTs. The collection of field data was conducted on a one–half mile section of US 24/40, close to the Lawrence Municipal Airport. The purpose of this chapter is to describe the data collection procedures followed throughout this stage of the study.

5.1 Concept

In general, the concept of the data collection design was based on a desire to evaluate the accuracy of data provided by each device in comparison to the control device and the impact of the devices used in this study on driver behavior when deployed on the road. To achieve this concept, PRTs were selected as a control device and were present throughout the entire period of the data collection.

5.2 Data Collection Procedure

5.2.1 Pneumatic Road Tubes

PRTs as a control device in this study were always present throughout the data collection period at the upstream and downstream locations, as shown in the Figure 19, to compare its collected data with the data collected by other devices. Because PRTs are intrusive portable traffic

counting devices, the data collection crew had to enter the road to install it on the pavement. For installation of the PRTs, at least two people were required.

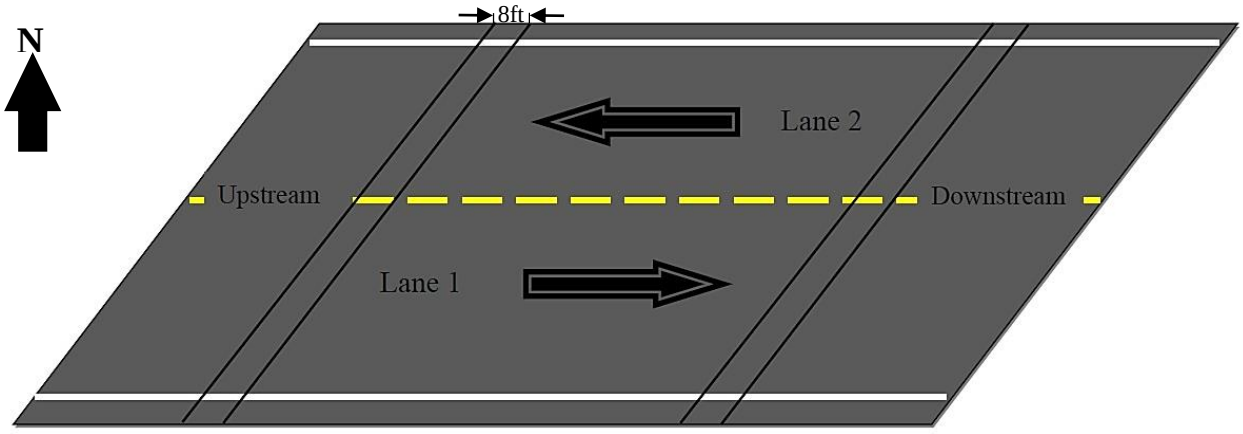


Figure 15. PRTs at Upstream and Downstream Test Locations

When the locations of fixing tubes was decided, a pair of tubes was laid across the road at a distance of eight feet perpendicular to the direction of traffic. The tubes were first nailed and clamped by a special metallic clamp and then were pulled from other end tightly as shown in Figure 20. While one person was holding the tube end another person clamped it, and then entered the road to tape the tubes to the pavement in the center, edge of each lane, and shoulders using special mastic tape. After laying the tubes properly, the other end was connected to the automatic traffic counter. After inputting the type of layout, spacing between the tubes, name of the site, the local time, and testing the air pulses of installed tubes, the counter was setup for data collection. The counter was chained and locked to a nearby pole at the side of the road to prevent it from getting stolen or vandalized, as shown in Figure 21.

During the first week of the data collection process, the data were collected by two sets of PRTs without any other devices to determine driver responses toward the control device only. After collecting data for an entire three normal days, the data were extracted on a USB and transferred to the database as a Microsoft Excel file using a special software (TRAXPro) provided by the manufacturer. For the rest of the data collection period, the same processes were followed to deploy the PRTs, but in fourth and fifth weeks, when a Wavetronix SmartSensor HD was deployed on lane 2 of the road, the automatic traffic counters for both sets were secured at the lane 2 side of the road.

Figure 16 Fixing End of Road Tubes on Road

Figure 17 Fixing Automatic Traffic Counter in Site

5.2.2 iCone

The iCone was tested for accuracy of its data collection for traffic speeds and counts and for driver behavior regarding the iCone presence on the road. The iCone was deployed parallel to the adjacent traffic lane, as shown in the Figure 22. For the second and third weeks of data collection, the same processes were followed for installing the PRTs, while one unit of iCone was located 70 ft. away to east of the downstream set of the PRTs. The location of the iCone was on the edge of the right shoulder at the downstream section of US-24/40: a two-lane, two-way

rural highway with a posted speed limit of 55 mph near the Lawrence Municipal Airport, Lawrence, KS. The iCone was setup to collect data and began to appear online with a good signal as shown in the Figure 23.

The data collection process was conducted for two weeks, from March 3, 2015 to March 6, 2015 and from March 10, 2015 to March 12, 2015. Even though the iCone was switched off on March 5 at 4:08 a.m. because of a fault in the battery, the iCone was allowed to stay in its location to allow PRTs to collect enough data for evaluation of driver response toward the iCone presence. After conducting the data collection in the field, the data were extracted from the iCone website, http://www.iconetraffic.com/, on a Microsoft excel sheet for the entire period and saved in the database for the next steps, the data reduction and statistical analysis.

Figure 18 Parallel Orientation of iCone

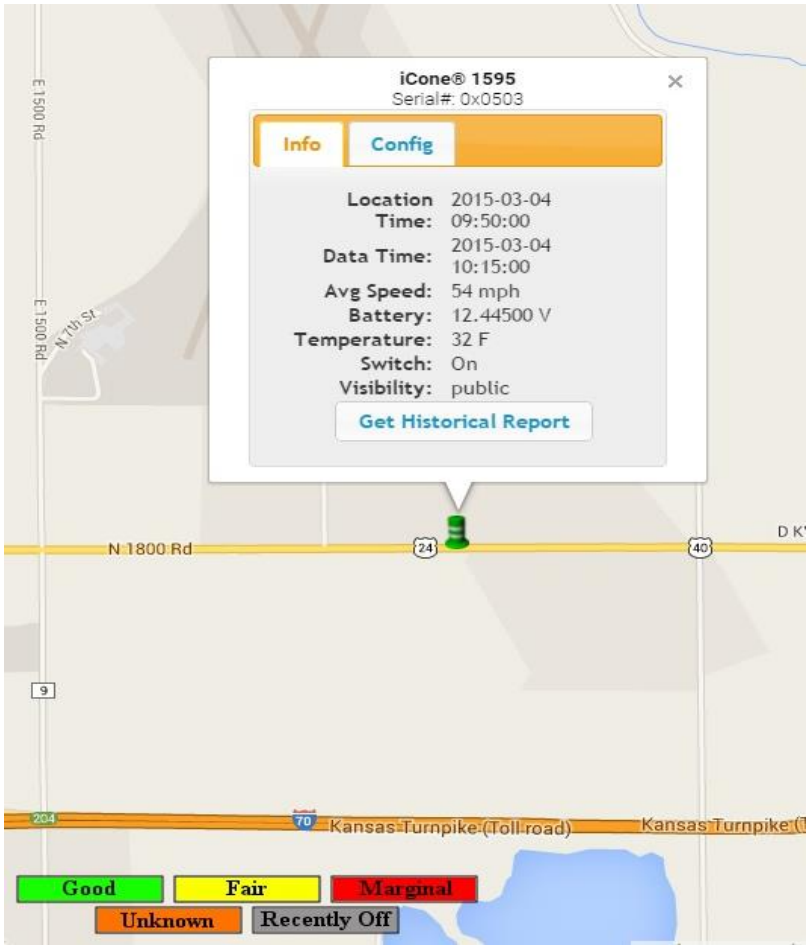


Figure 19 Website Interface of iCone

5.2.3 Radar Recorder

During the fourth week of data collection, the PRTs were installed following the same process as previously mentioned, while one Radar Recorder was mounted to a nearby utility pole. The pole was 20 ft away from edge of the first traffic lane at the right side of the road next to the downstream set of the PRTs. To mount the Radar Recorder, two of clamp bands were used to secure it to the utility pole 7.2 ft above the ground. The bracket was facing traffic on a 45-degree horizontal angle and tightened to the pole by a fastener as shown in the Figure 24. The Radar Recorder was mounted through inserting the pegs on its back into the holes of the bracket as shown in the Figure 25.

Figure 20 Clamp Band and Mounting Bracket (JAMAR technologies, Inc.)

Figure 21. Mounted Radar Recorder

The vertical angle was adjusted and the installation was checked through the Live View button on the Radar Recorder Setup screen to ensure the data accurately recorded as shown in the Figure 26.

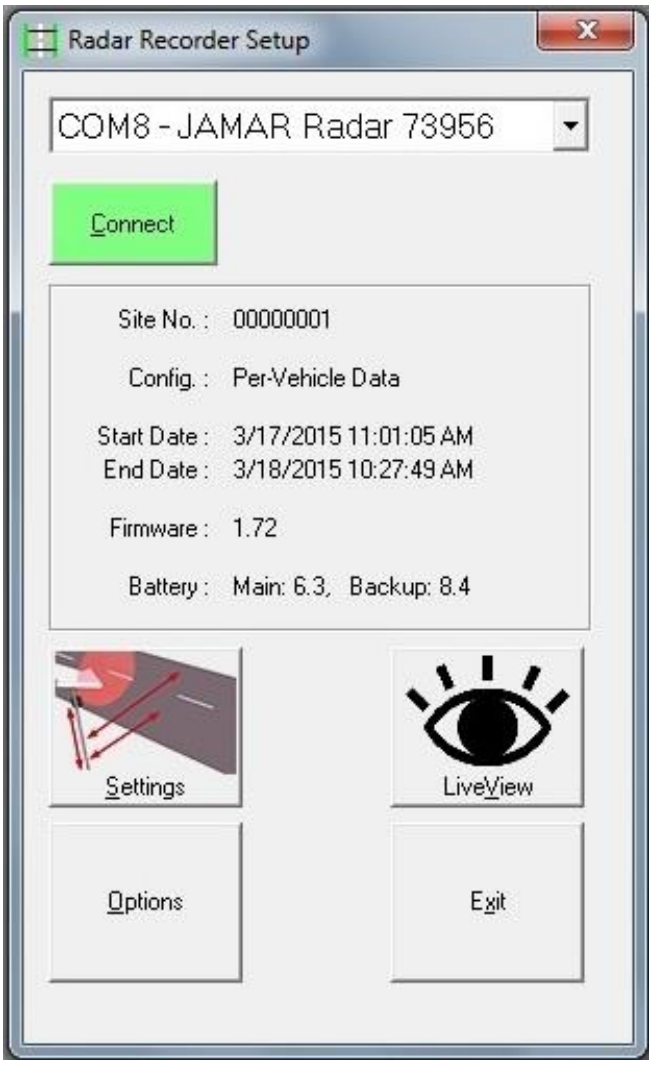


Figure 22. Radar Recorder Setup Screen

At the end of the data collection processes, the data were downloaded directly by Bluetooth to the laptop and then transferred to the database for the next steps.

5.2.4 Wavetronix SmartSensor HD

The Wavetronix SmartSensor HD is a non-intrusive and portable traffic device as shown in Figure 27. Therefore, the collection crew was able to setup the device without disrupting the traffic as shown in the Figure 28.

Figure 23. Wavetronix SmartSensor HD with Trailer

The Wavetronix SmartSensor HD installation takes more than an hour to set up and requires at least three people for this process. To install the Wavetronix on a level and hard surface, KDOT suggested a concrete paved spot located near to the intersection of US 24/40 and E 1500 Rd. beside lane 2 of the road. The device was fixed 25 ft offset from the first detection lane and 26 ft above the ground level.

Figure 24. Installation and setup of the Wavetronix

The sensor was aligned perpendicularly to the traffic approach and to aim at the center of the detection area and then connected to a laptop to check the sensor alignment. The green arrow showed that the alignment was exactly perpendicular to the traffic lanes, while the oblique yellow arrow showed that the alignment of the sensor was incorrect as shown in the Figure 29. The data collection processes with the Wavetronix device continued for two weeks, the fifth and sixth weeks of the data collection effort. Through the fifth week of the data collection, March 23, 2015 to March 27, 2015, the upstream set of PRTs encountered a fault that caused an error in the data at that location. Therefore, it was decided to extend the data collection processes one extra

week in order to get sufficient data for the driver response part of the study. On the sixth week, the data were collected until Wednesday morning, but then was halted as some paving work had been started at the test location and the road became a work zone. At the end of the data collection process, the data were downloaded directly from the internet to a laptop and then transferred to the database for the data reduction and analysis stage.

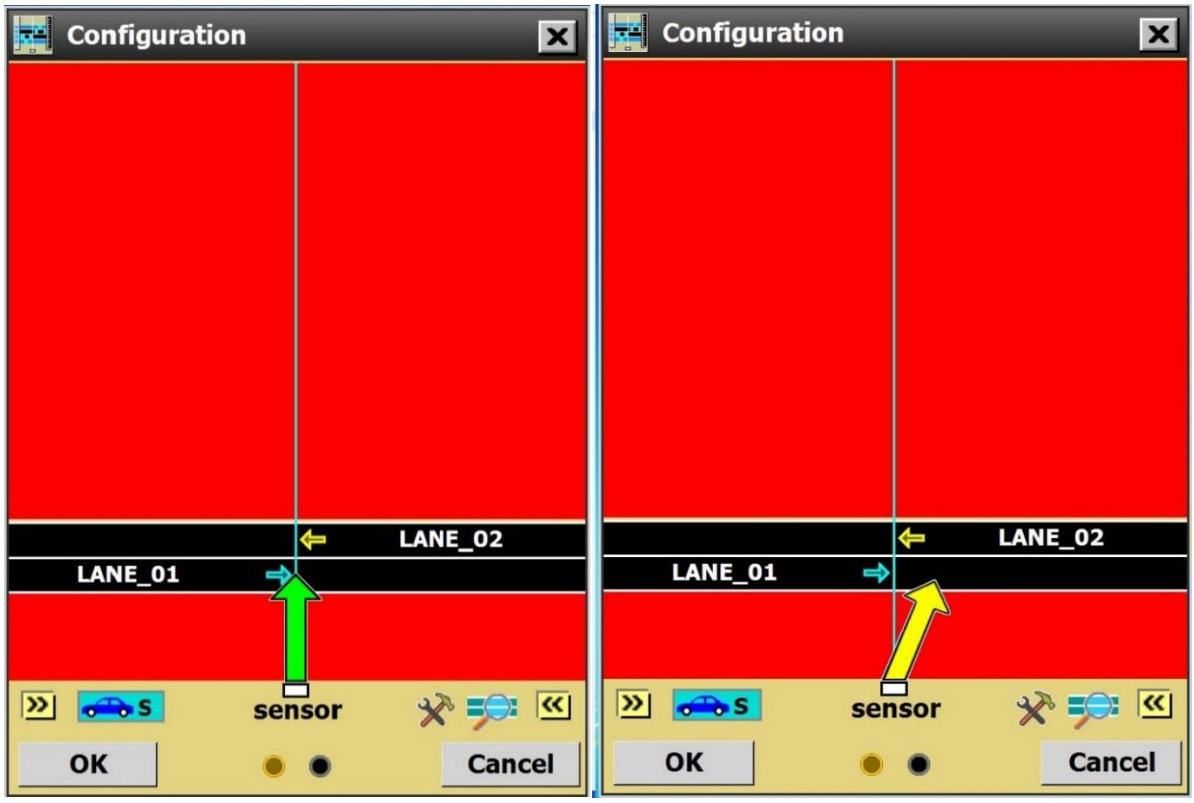


Figure 25. Wavetronix SmartSensor Alignment

After downloading the collected data, the data were arranged according to the used device and then the data reduction step was started.

CHAPTER 6. DATA REDUCTION

This chapter outlines the procedure used to form a database for reducing raw data to be compatible for analyzing the collected data. The steps outlined below describe of the procedures followed to reduce the traffic speed and the volume data of each device used in comparison with the control device.

6.1 Speed Data

In order to evaluate the accuracy of each test device against the control device in collecting traffic speed data, the data collected by the control device (PRTs) at the downstream location were prepared for statistical comparison and analysis with the test device. Because each device collected speed data in different ways, the data reduction procedure for each comparison between PRTs and the test device(s) required a different evaluation method. PRTs and the Radar Recorder collected individual traffic data for each vehicle, while the iCone and Wavetronix SmartSensor HD collected data for one-minute intervals. The following are the procedures followed to convert the raw data to a common format.

6.1.1 Pneumatic Road Tube

The PRTs provides individual detection; that is, the traffic parameters in each row of the data table represented an individual detected vehicle on the road. The data could then be extracted to a Microsoft Excel file, which displayed some details about the test location and time in addition to many traffic parameters of a detected vehicle in different columns. The traffic parameters included date and time of detection, lane, axle, space between axles, class of vehicle, length, speed, gap, and number of axles between (1-2) to (15-16) axles as shown in the Figure 30.

Start Date: 3/17/2015											
Start Time: 11:01:28 AM											
Site Code: 00000001											
Station ID: US 24/40											
Longitude: 39°00'01.9"North											
Latidude: 95°12'45.3"West											
Veh. No.	Date	Time	Lane	Axles	Spec	Class	Length (In Inches)	Speed (In MPH)	Gap (In Seconds)	Follow (In Inches)	Axle 1-2
420	3/17/2015	12:00:05 PM	2	0	0	1	201	62	14	0	
421	3/17/2015	12:00:41 PM	1	0	0	1	130	60	60	0	
422	3/17/2015	12:00:44 PM	1	0	0	1	169	58	3	0	
423	3/17/2015	12:00:55 PM	2	0	0	1	205	63	50	0	
424	3/17/2015	12:01:27 PM	1	0	0	1	169	55	43	0	
425	3/17/2015	12:01:44 PM	2	0	0	1	169	68	49	0	
426	3/17/2015	12:01:55 PM	2	0	0	1	224	67	11	0	
427	3/17/2015	12:02:10 PM	1	0	0	1	165	72	43	0	
428	3/17/2015	12:02:20 PM	2	0	0	1	220	57	25	0	
429	3/17/2015	12:02:21 PM	1	0	0	1	189	60	11	0	
430	3/17/2015	12:02:47 PM	2	0	0	1	252	57	27	0	
431	3/17/2015	12:02:51 PM	2	0	0	1	264	57	4	0	
432	3/17/2015	12:02:53 PM	2	0	0	1	280	59	2	0	
433	3/17/2015	12:02:55 PM	2	0	0	1	217	58	2	0	
434	3/17/2015	12:02:56 PM	2	0	0	1	307	61	1	0	
435	3/17/2015	12:02:58 PM	2	0	0	1	244	58	2	0	
436	3/17/2015	12:03:03 PM	2	0	0	1	224	58	5	0	
437	3/17/2015	12:03:05 PM	1	0	0	1	150	59	44	0	
438	3/17/2015	12:03:14 PM	2	0	0	1	220	62	11	0	

Figure 26. Raw Data from Counter of PRTs

Through the data reduction processes, most of the columns were deleted, only the four highlighted columns were used in this study. On the other hand, a new column was added and named Light Conditions, which displayed the light conditions through each test day in order to study light condition on the driver behavior toward the devices. The Light Conditions column was divided into four period;

- Sunrise, which was one hour in length each day (half an hour before and after sunrise),
- Sunset, which was one hour in length each day (half an hour before and after sunset),
- Day, which covered the time between sunrise and sunset, and
- Night, which presented the time between sunset and sunrise of the next day.

To conduct the evaluation for the devices against the control device, the time intervals of data on both lanes of the downstream, where the test devices were deployed, had to conform. Therefore, the data were classified to five–minute intervals and two new columns were added named, Count and Average Speed, for listing the count and average speed of vehicles in each interval.

6.1.2 iCone

The output data created by the iCones could be downloaded through the website, iconeproducts.com, as a CSV file, which could then be opened by the Microsoft Excel program, or a graph. The Microsoft Excel file contained many traffic parameters in each column such as; a coordination of the iCone's deployed location, iCone ID, local time, number of vehicles detected, average speed, standard deviation of speeds, practical speed, and speed bins from (00-05) mph to (95-100) mph, as shown in the Figure 31. In the reduction stage, only three columns were of interest: the local time, number of vehicles, and average speed columns.

	A	B	C	D	E	F	G	H	I	J
1	Latitude	Longitude	Percentile							
2	39.0005315	-95.2125395	85							
3	iConeID	localTime	numReads	avgSpeed	stDevSpeed	pctSpeed	bin0005	bin0510	bin1015	bin1520
4	1595	3/10/2015 10:13	6	50.333	6.6667	59.9334	0	0	0	0
5	1595	3/10/2015 10:14	5	51	4.5826	57.5989	0	0	0	0
6	1595	3/10/2015 10:15	4	58.25	3.0619	62.6591	0	0	0	0
7	1595	3/10/2015 10:16	5	53	6	61.64	0	0	0	0
8	1595	3/10/2015 10:17	5	55	4.899	62.0546	0	0	0	0
9	1595	3/10/2015 10:18	9	47	5	54.2	0	0	0	0
10	1595	3/10/2015 10:19	5	49	7.8316	60.2775	0	0	0	0
11	1595	3/10/2015 10:20	9	53.111	2.9397	57.3443	0	0	0	0
12	1595	3/10/2015 10:21	7	50.571	5.9476	59.136	0	0	0	0
13	1595	3/10/2015 10:22	8	54.5	6.455	63.7952	0	0	0	0
14	1595	3/10/2015 10:23	3	53.667	3.3333	58.4666	0	0	0	0
15	1595	3/10/2015 10:24	7	52	3.2733	56.7136	0	0	0	0
16	1595	3/10/2015 10:25	11	51.545	15.2174	73.4585	0	0	0	1
17	1595	3/10/2015 10:26	8	58.25	6.8465	68.109	0	0	0	0
18	1595	3/10/2015 10:27	4	54.5	3.5355	59.5911	0	0	0	0
19	1595	3/10/2015 10:28	9	57	5	64.2	0	0	0	0
20	1595	3/10/2015 10:29	5	57	0	57	0	0	0	0
21	1595	3/10/2015 10:30	5	56	4.5826	62.5989	0	0	0	0
22	1595	3/10/2015 10:31	6	55.333	4.5644	61.9061	0	0	0	0
23	1595	3/10/2015 10:32	9	55.889	6.8606	65.7682	0	0	0	0
24	1595	3/10/2015 10:33	2	54.5	3.5355	59.5911	0	0	0	0
25	1595	3/10/2015 10:34	8	58.875	6.0757	67.624	0	0	0	0
26	1595	3/10/2015 10:35	7	59.143	3.4993	64.1818	0	0	0	0
27	1595	3/10/2015 10:36	4	59.5	3.5355	64.5911	0	0	0	0
28	1595	3/10/2015 10:37	12	52.417	5.99	61.0423	0	0	0	0

Figure 27. Raw Data from iCone

The iCone collected traffic speed data for each minute. That means each speed value represented a measurement of average speed for vehicles detected through one minute of the data collection period. To avoid inconsistencies in time between the speed data collected by the control device (which collected individual speeds) and the average speed collected by the iCone, the data were collected by PRTs and the iCone were averaged into each five minutes intervals. This conformity was conducted after deleting error data were created by both devices, such as zero speeds in iCone data and class 14 and 15 in PRTs data. In PRTs data, a row of data that

appeared with zero speed and classification number more than 13 were deleted; in the iCone data, any row of data with a zero count and speed were removed.

6.1.3 Radar Recorder

The Radar Recorder's technique in data collection was similar to the control device (PRTs) regarding the detection of traffic speeds. The traffic parameters in each row of the data table represented an individual detected vehicle on the road. The Radar Recorder data were extracted to a Microsoft Excel file, which displayed some details about the test location and time in addition to many traffic parameters in different columns in way similar to the PRTs. Therefore, the entire data reduction process was carried out identical to that of the PRTs.

6.1.4 Wavetronix SmartSensor HD

Compared to the other devices, the data created by the Wavetronix SmartSensor HD was already in Microsoft Excel file format. The created file contained seven sheets for this study:

- Meta Data sheet, which included the test details like the date, time, and location;
- Occupancy sheet, which showed the occupancy of vehicles in each traffic lane;
- Speed Data sheet, displayed the average speed in each traffic lane for each interval;
- Volume Data sheet, demonstrated the traffic volume in each traffic lane for each interval;
- Lane_# sheet showed many traffic parameters of detected vehicles passing a specific traffic lane. In this study, two lanes displayed in this file, each lane in a separate sheet, because the road section was two–lane as shown in the Figure 32; and
- Smart Sensor Data sheet, which combined all traffic information displayed on previous sheets except the Meta Data sheet.

In the fifth week of the data collection process, the interval of data collection with the Wavetronix SmartSensor HD was set up for one minute, but in the sixth week, the interval was modified to five minute. The data collected in the fifth week were collected for the entire week, but the sixth week was cut short. Only the data of the fifth week was used in the evaluation of Wavetronix accuracy. Base on this, the reduction process and the conformity of data were conducted the same way as with the iCone data.

SENSOR TIME (MM/dd/yy HH:mm:ss)	LANE/APPROACH NAME	VOLUME	SPEED (mph)	OCCUPANCY(%)	85% SPEED (mph)	HEADWAY	GAP	INTERVAL (sec)
03/24/15 00:00:00	LANE_01	1	48.7	0.5	49	60	59.7	60
03/24/15 00:00:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:01:00	LANE_01	1	50.9	0.5	51	60	59.7	60
03/24/15 00:01:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:02:00	LANE_01	1	26	0.8	26	60	59.5	60
03/24/15 00:02:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:03:00	LANE_01	0	0	0	0	0	0	60
03/24/15 00:03:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:04:00	LANE_01	1	51.3	0.6	52	60	59.6	60
03/24/15 00:04:00	LANE_02	1	59.8	0.4	60	60	59.7	60
03/24/15 00:05:00	LANE_01	0	0	0	0	0	0	60
03/24/15 00:05:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:06:00	LANE_01	0	0	0	0	0	0	60
03/24/15 00:06:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:07:00	LANE_01	1	41.8	0.6	42	60	59.7	60
03/24/15 00:07:00	LANE_02	2	50.8	1	55	30	29.7	60
03/24/15 00:08:00	LANE_01	1	45.4	0.5	46	60	59.7	60
03/24/15 00:08:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:09:00	LANE_01	0	0	0	0	0	0	60
03/24/15 00:09:00	LANE_02	1	41.3	1.3	42	60	59.2	60
03/24/15 00:10:00	LANE_01	0	0	0	0	0	0	60
03/24/15 00:10:00	LANE_02	1	53.4	0.5	54	60	59.7	60
03/24/15 00:11:00	LANE_01	1	42.3	2.2	43	60	58.7	60
03/24/15 00:11:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:12:00	LANE_01	1	44.7	0.6	45	60	59.6	60
03/24/15 00:12:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:13:00	LANE_01	0	0	0	0	0	0	60
03/24/15 00:13:00	LANE_02	1	58.6	0.5	59	60	59.7	60
03/24/15 00:14:00	LANE_01	0	0	0	0	0	0	60
03/24/15 00:14:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:15:00	LANE_01	1	55	0.5	56	60	59.7	60
03/24/15 00:15:00	LANE_02	0	0	0	0	0	0	60
03/24/15 00:16:00	LANE_01	0	0	0	0	0	0	60

Meta Data | OCCUPANCY(%) Data | SPEED (mph) Data | VOLUME Data | LANE_02 | LANE_01 | SmartSensorData | ...

Figure 28. Wavetronix Raw Data

6.2 Count Data

The considerable diversity in the method of counting traffic volumes by the devices used in this study required adjustments to the volume data between the control device and the other devices. The traffic volumes for both lanes of the downstream set of PRTs devices in the third, fourth, and fifth week of the data collection were combined into five–minute increments in order to compare with volume data of the iCone, Radar Recorder, and the Wavetronix SmartSensor HD, respectively. Second and sixth weeks' data were unsuitable and were ignored, as shown in the Table 22, because of a fault occurring in the iCone's battery in the second week and the period of the data collection in the fifth week with Wavetronix was longer than the sixth week. In a similar way, to conform the speed to five–minute intervals of average speed, the reduction of the traffic volume followed the same method. The only difference was that the speeds were averaged, while the volumes were accumulated for each data detection period.

Table 22. Data Collection Schedule with Record of Unsuitable Data

Device	Week	First Week	Second Week	Third Week	Fourth Week	Fifth Week	Sixth Week
	Date	Feb.,24 - Feb., 27	March 3 - March 6	March 10 - March 12	March 17 - March 20	March 23 - March 27	March 30 - April 1
Control Device	Upstream	PRTs	PRTs	PRTs	PRTs	PRTs*	PRTs
	Downstream	PRTs	PRTs	PRTs	PRTs	PRTs	PRTs
Tested Devices	Downstream	N/A	iCone*	iCone	Radar Recorder	Wavetronix	Wavetronix*

*- Unsuitable Data
N/A - Tested Devices not deployed
PRTs- Pneumatic Road Tubes

6.3 Driver Behavior

The selected method to verify experimentally the driver response regarding the existence of the devices along the roadway was comparing the traffic speed detected by PRTs at upstream and downstream with and without deploying any device beside the PRTs around the downstream location. To substantiate this methodology, the data in both lanes during the first week, and lane 1 at the second, third, fourth, and sixth week were cleaned from error data. The fifth weeks' data were unsuitable, as shown in the Table 22, because the upstream set of the PRTs did not collect accurate data, and so those data were not used. The only required traffic parameter for this comparison was the speed. Therefore, other parameters were ignored for this comparison.

CHAPTER 7. DATA ANALYSIS

The primary goal of the data analysis was to compare the accuracy of the iCone, Radar recorder, and Wavetronix SmartSensor HD devices against PRTs in detecting traffic speed and volume. The secondary goals were to compare the driver response toward the existence of devices along the road and the usability of the studied devices.

7.1 Comparison of Mean Speeds

The first objective of this study was to measure the accuracy and the first measured parameter was speed. The traffic speeds were detected at the downstream location by PRTs and each tested device was statistically analyzed based on the hypothesis shown in the next section.

7.1.1 Research Hypothesis

The test hypothesis used for comparing the accuracy of the tested devices in collecting the traffic speed was divided to two stages: the average speed for each interval measured by the PRTs minus the average speed for each interval measured by the individual data collection device would be the same for all respective data collection device.

H_o: $\Delta\mu_{si} = \Delta\mu_{sj} = \Delta\mu_{sk}$

$H_{a:}$ At least one of them not equal

Where: $\Delta\mu_s$ = (average of mean speed $_{PRTs}$ - average of mean speed $_{Device}$);

i = iCone;

j = Radar Recorder; and

k = Wavetronix SmartSensor HD.

If in the first stage of the analysis, it was found that the null hypothesis was rejected, then in the second stage of the analysis, the objective was to determine which one (or more) of the devices different from the PRTs. The null and alternative hypotheses for the second stage were:

H_o: $\mu_s = \mu_{si}$ H_a: $\mu_s \neq \mu_{si}$

H_o: $\mu_s = \mu_{sj}$ H_a: $\mu_s \neq \mu_{sj}$

H_o: $\mu_s = \mu_{sk}$ H_a: $\mu_s \neq \mu_{sk}$

Where: μ_s = average of mean speed $_{PRTs}$;

i = iCone;

j = Radar Recorder; and

k = Wavetronix SmartSensor HD.

7.1.2 Analysis

The average of mean speed as recorded by the PRTs and each respective data collection device was computed for a five–minute speed intervals. In first stage, The F-test was computed to determine if the average speed for each interval measured by the PRTs minus the average speed for each interval measured by the individual data collection device was significantly different for all respective data collection devices. The p-value for the difference of the average of mean speeds recorded by the devices was statistically significant at the 0.05 level of significance as shown in the Table 23.

Table 23. One-way ANOVA: Δ Average Speed of (PRTs-Devices) versus device

Source	Degree of Freedom (DF)	Sum of Square (SS)	Mean Square (MS)	F	P-value
Device	2	20.42	10.21	9	0.001
Error	33	37.45	1.13		
Total	35	57.86			

Based on the result of the first stage, at the second stage paired t-tests were computed to determine if the average of mean speed recorder by the PRTs and each tested device was significantly different for each interval. Significant differences were indicated by an asterisk in Table 24. As shown, the differences between the average of mean speed recorded by the PRTs and the average of mean speed recorded by iCone, Radar Recorder, and Wavetronix SmartSensor HD were significantly different at the 0.05 level of significance as shown in Table 24. The differences between average of mean speeds recorded by the PRTs and both the iCone and Radar Recorder were 0.86 and 0.81 mph in positive value, respectively, while the same parameter between the PRTs and the Wavetronix SmartSensor HD was slightly greater than one mph in negative value. That means, the errors in detecting speeds by the iCone, Radar Recorder, and Wavetronix SmartSensor HD in comparison to the speeds were detected by PRTs were 1.5, 1.4, and 2.1 percent, respectively.

Table 24. Paired T-Test for Average Speed at Downstream of PRTs with Other Devices

Tested Devices	Location of Devices	No. of Intervals	Mean	St. Dev.	Difference (mph)	Error (%)	P-Value	Test Week
PRTs	Lane 1-Downstream	620	57.10	2.7	0.86*	1.5	<0.0001	3rd
iCone		620	56.25	2.46				
PRTs	Lane 1-Downstream	701	57.35	3.02	0.81*	1.4	<0.0001	4th
Radar Recorder		701	56.54	5.33				
PRTs	Lane 2-Downstream	820	50.45	4.65	-1.07*	2.1	<0.0001	6th
Wavetronix		820	51.52	4.59				

7.2 Comparison of Mean Volumes

The second objective of this study was to measure the accuracy of the traffic volume parameter. The traffic volumes were detected at the downstream location by the PRTs and each of the tested devices was statistically analyzed based on hypothesis testing.

7.2.1 Research Hypothesis

The test hypothesis used for comparing the accuracy of the tested devices in collecting the traffic volume, similar to the traffic speed comparison, was conducted in two stages. The average vehicle numbers for each interval detected by the PRTs minus the average vehicle numbers for each interval detected by the individual data collection device were compared.

H_o: $\Delta\mu_{vi} = \Delta\mu_{cj} = \Delta\mu_{vk}$

$H_{a:}$ At least one of them not equal

Where: $\Delta\mu_v$ = (average of mean volume $_{PRTs}$ - average of mean volume $_{Device}$);

i = iCone;

j = Radar Recorder; and

k = Wavetronix SmartSensor HD.

The statistical performance of the second stage of the analysis depended on the result of the first stage. When the comparison result verified that, the null hypothesis of the first stage could be rejected, the second stage's null hypothesis would be that the average of mean volume collected by PRTs would be the same as the average of mean volume collected by any individual device.

H_o: $\mu_v = \mu_{vi}$ H_a: $\mu_s \neq \mu_{vi}$

H_o: $\mu_v = \mu_{vj}$ H_a: $\mu_v \neq \mu_{vj}$

H_o: $\mu_v = \mu_{vk}$ H_a: $\mu_v \neq \mu_{vk}$

Where: μ_v = average of mean volume $_{PRTs}$;

i = iCone;

j = Radar Recorder; and

k = Wavetronix SmartSensor HD.

7.2.2 Analysis

For the PRTs and each respective data collection device, the detected average of mean volume was computed for five–minute volume intervals. Firstly, to determine whether the average volume for each interval measured by the PRTs minus the average volume for each interval measured by the individual data collection device was significantly different for all respective

data collection device or not, the F-test was applied. The p-value for the differences of the average of mean volumes detected by the devices was statistically significant at the 0.05 level of significance as shown in the Table 25.

Table 25. One-way ANOVA: Δ Count (PRTs-Devices) versus device

Source	DF	SS	MS	F	P-value
Device	2	349.42	174.71	22.07	<0.0001
Error	33	261.26	7.92		
Total	35	610.69			

At the second stage, paired t-tests were computed to determine if the average of mean volume recorded by the PRTs and each tested device was significantly different for each interval. As shown in the Table 26, significant differences were indicated by an asterisk. The differences between the average of mean volume recorded by the PRTs and the average of mean volume recorded by the iCone, and Radar Recorder were significantly different at the 0.05 level of significance, while the PRTs value in comparison to the Wavetronix SmartSensor HD was not statistically significant. The differences between average of mean volume detected by the PRTs and both the iCone and Radar recorder were less than 1.5 vehicles for each five–minute interval, while the same parameter between the PRTs and the Wavetronix SmartSensor HD was almost zero vehicles per five–minute interval. The error in detected traffic volumes by the iCone and Radar Recorder were 8.6 percent and 7.8 percent, respectively, while detected traffic volumes by the Wavetronix SmartSensor HD was not significantly different in comparison to the volumes were detected by PRTs for each interval.

Table 26. Paired T-Tests for Average Volumes at Downstream of PRTs with Other Devices

Tested Devices	Location of Devices	No. of Intervals	Mean	St. Dev.	Difference (mph)	Error (%)	P-Value	Test Week
PRTs	Lane 1-Downstream	620	26.01	16.62	-2.22*	8.6	<0.0001	3rd
iCone		620	28.23	15.43				
PRTs	Lane 1-Downstream	701	23.86	16.07	-1.85*	7.8	<0.0001	4th
Radar Recorder		701	25.71	17.51				
PRTs	Lane 1-Downstream	820	24.8	17.25	-0.06	0	0.711	6th
Wavetronix		820	24.87	17.53				

7.3 The Effect of Devices on Driver Behavior

The driver response towards the deployed devices around the traffic approaches was one of the objectives of the study. The differences of speeds between the upstream and downstream locations were detected by the PRTs and were considered as a base condition against each device.

7.3.1 Research Hypothesis

The applied research hypothesis to test the driver response in the presence of the tested devices on the road side were divided into two related stages. In the first stage, the test hypothesis used was split into two separated conditions.

The first condition's test hypothesis was that the difference in the speeds as detected by the PRTs at the upstream and downstream locations would be the same for each traffic lane and all light conditions (Day, Sunset, Night, and Sunrise).

H_o: $\Delta S_p = \Delta S_i = \Delta S_j = \Delta S_k$ (for each traffic lane and all light conditions)

H_a: At least one of them not equal to ΔS_p

Where: ΔS = difference speeds at upstream and downstream as recorded by PRTs;

p = PRTs only;

i = iCone;

j = Radar Recorder; and

k = Wavetronix SmartSensor HD.

The second condition's test hypothesis was that the difference in the speeds as detected by the PRTs at the upstream and downstream locations would be the same for each deployed device and all light conditions (Day, Sunset, Night, and Sunrise).

H_o: $\Delta S_p = \Delta S_i = \Delta S_j = \Delta S_k$ (for each deployed device and all light conditions)

H_a: At least one of them not equal to ΔS_p

If at the first stage the null hypothesis was rejected, the second stage's test hypothesis would be respectively as shown below:

H_o: $\Delta S_p = \Delta S_i$

H_a: $\Delta S_p \neq \Delta S_i$

H_o: $\Delta S_p = \Delta S_j$

H_a: $\Delta S_p \neq \Delta S_j$

H_o: $\Delta S_p = \Delta S_k$

H_a: $\Delta S_p \neq \Delta S_k$

7.3.2 Analysis

The research hypotheses to test the driver response in the presence of the tested devices when they were on the roadside were divided into two related stages. In the first stage, the test hypothesis used was split into two separated conditions.

The first condition compared the difference in speeds between the upstream and downstream location for the base data, the PRTs data when no other devices present. The analysis considered differences based on the traffic lanes and light conditions of the data collection time. The F-test determined that the differences of the recorded speeds were significantly different for each lane, while the differences were statistically not significant for the light conditions, as shown in the Table 27.

The second condition compared the difference in speeds between the upstream and downstream location when each of the devices were deployed in addition to the PRTs, based on the deployed device and light conditions. The F-test determined that the differences of the recorded speeds were significantly different for each device presence, while the differences were not statistically significant when compared to the first condition for the light conditions, as shown in the Table 28.

Table 27. Δ Speed (Upstream - Downstream) versus Lane, Light Conditions

Source	DF	SS	MS	F	P-value
Lane	1	260.743	260.743	3238.14	<0.0001
Light	3	0.377	0.126	1.56	0.237
Interaction	3	1.098	0.366	4.55	0.017
Error	16	1.288	0.081		
Total	23	263.507			

Based on the results of both conditions in the first stage, the research hypothesis of the second stage was tested. In this stage, the t-test was applied on speed data at the upstream and downstream locations when each tested device was deployed at the roadside beside the control device. The comparison between the upstream and downstream speeds detected by the PRTs when all devices, iCone, Radar Recorder, and Wavetronix SmartSensor HD were deployed significantly different at the 0.05 level of significance at all light conditions. The details of the t-test results are shown in Appendix C. (Table C8-C13).

Table 28. Δ Speed (Upstream-Downstream) versus Devices Existence, and Light Conditions

Source	DF	SS	MS	F	P-value
Device	4	627.363	156.841	866.15	<0.0001
Light	3	0.393	0.131	0.72	0.557
Error	12	2.173	0.181		
Total	19	629.929			

The differences in the mean of speeds between the upstream and downstream locations when no devices were deployed other than the PRTs and the detected speed change between the upstream and downstream locations when each device was deployed other than the PRTs in different light conditions were calculated to show how the drivers responded toward the used devices. The means of the different speeds between the upstream and downstream locations through all light conditions in lane 1 when the iCone and Radar Recorder devices deployed were

subtracted from the means of the different speeds between the upstream and downstream locations through all light conditions in lane 1 when no devices were deployed to get the differences in driver behavior. Figure 33 shows these differences for all light conditions. More details are shown in Appendix B.

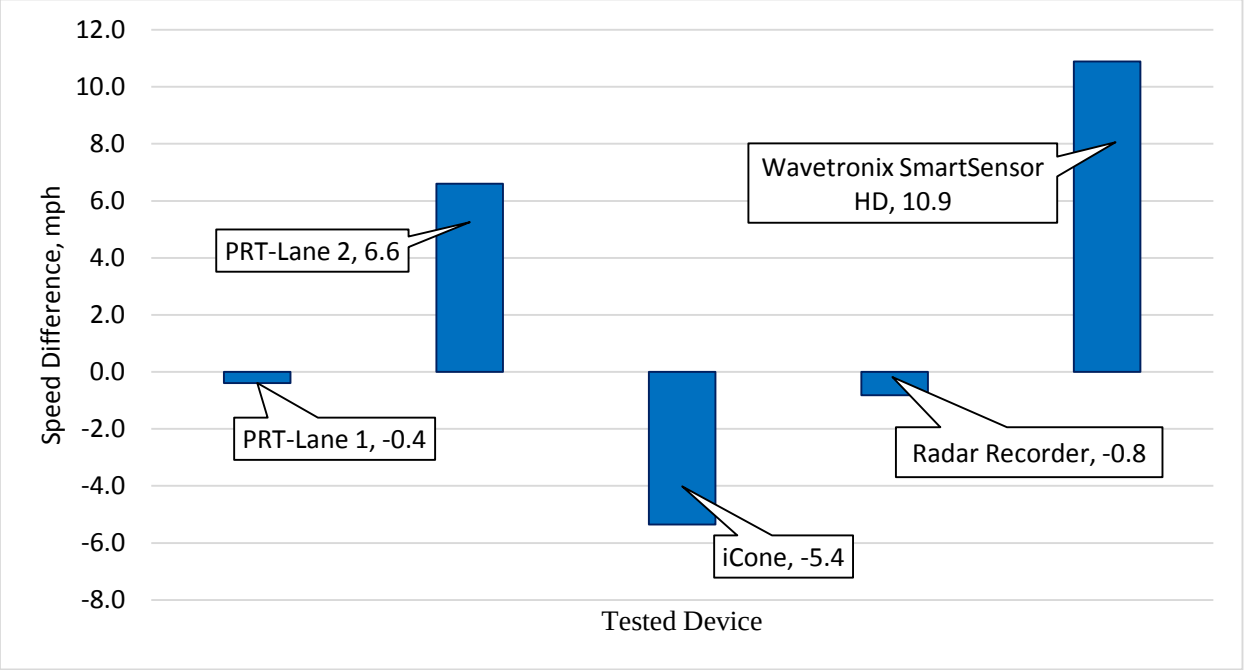


Figure 29 Summary of Difference in the Speed between Upstream and Downstream

For example, the mean of the different speeds between the upstream and downstream locations through all light conditions in lane 1, when there was only the control devices deployed, was -0.4 mph. The mean of the different speeds between the upstream and downstream locations at the same light conditions and the same lane when the iCone was deployed beside the control devices was -5.4 mph. Both the values were subtracted and a difference of 5.0 mph was found. This 5.0 mph change in the speed was used to show how the drivers acted toward the existence of the tested devices beside the road. The differences of the

driver behavior toward the Wavetronix SmartSensor HD were performed in the similar way, but the values in lane 2 were used as shown in Table 29. For more details, see Figure C-1 at appendix C.

Table 29. Driver Response Differences toward Tested Devices Based on PRTs Measured Speeds

Light Conditions	Δ PRTs (mph)		Δ Tested Devices (mph)			Difference (mph)		
	Lane 1	Lane 2	iCone	Radar Recorder	Wavetronix SmartSensor HD	iCone	Radar Recorder	Wavetronix SmartSensor HD
All Time	-0.4	6.6	-5.4	-0.8	10.9	5.0	0.4	-4.3
Day	-0.6	6.7	-5.5	-1.2	11.2	4.9	0.6	-4.4
Night	0.0	6.3	-5.1	-0.9	9.7	5.1	0.9	-3.4
Sunrise	0.2	6.5	-5.2	-0.7	10.8	5.4	0.9	-4.3
Sunset	-0.1	6.2	-4.5	-0.9	10.9	4.4	0.8	-4.7

The results showed that the drivers responded towards the devices were deployed on the roadside differently. They decreased their speed when the Wavetronix SmartSensor HD was installed, but they increased their speed when the radar Recorder and iCone were deployed regardless of the light conditions.

7.4 Comparison a Usability of Devices

Accuracy and driver behavior are not the only main factors in evaluating the devices. There are other factors equally important to consider like ease of installation, required labor hours, safety, and data extraction.

7.4.1 iCone

- Even though the iCone has a small footprint, it requires a sufficient shoulder on the roadside to be deployed, at least 3 ft. based on observations in this study.
- This device weight 60 lb each. Therefore, a truck is needed to transfer it and two people for its handling.
- Low temperature weather affects the charge of this device's battery. Therefore, it requires daily online inspection, especially during cold weather.
- Extraction of data was provided online with flexible options of time and date of required data and type of traffic data as well. Therefore, it does not require spending any time at the site for data extraction.
- It was observed that, when a heavy vehicle traveling at high speeds (60 mph in our case) passed by the iCone, the gust of wind created due to the speed of the vehicle slightly altered the orientation of the iCone, especially as the iCone was adjacent to the travelled lane. To ensure the proper functioning of the iCone, it was decided to locate the iCone away from the edge of the adjacent traffic lane and towards the end of the shoulder width, approximately three ft. from the edge of the travelled lane.

7.4.2 Radar Recorder

- The Radar Recorder device requires a fixed pole to be mounted to and at least two people for installation.
- The setting up process requires a laptop to connect to the device and input the location information and that could be conducted through the provided Bluetooth connection.

- Installation and running this device was required more than one hour.
- This device is powered from a battery, which can run up to seven days. Therefore, it does not require daily inspection.
- The data could be extracted by provided wireless Bluetooth technology or direct cable connection and that could be done at the site or anywhere else.

7.4.3 Wavetronix SmartSensor HD

- This device required a lot of labor assistance for installation, a truck to attach and transfer it to a specified site, and a hard, level surface to position the trailer adjacent to a road. Once the trailer was set at the designated location, setting up the device required a laptop to input the geometric information of the test location and activate it to collect data.
- Installation of this device required more than one hour.
- Wavetronix SmartSensor HD was sensitive to change in direction and it could affect the accuracy of the data. Therefore, frequent online inspection is important in order to record accurate data especially on windy days.
- Accuracy of collected data does not only depend on the detected vehicles, but also on the accuracy of the geometric information input into the device.
- This device is powered from a battery, which can be recharged by the attached solar cells. Therefore, it does not require any inspection.
- Extraction of data and changing the interval of data collection were provided online with flexible options of time and date of required data. Therefore, data extraction does not require spending any time at the site.

CHAPTER 8. FINDINGS AND RECOMMENDATIONS

In this chapter, a discussion of the meaning of the preceding analysis is presented, and the results from the comparison of each of the three devices with the PRTs are described. The chapter also evaluates their accuracy in detecting traffic speed, volume, and the effects of their presence on the driver behavior in addition to their usability though the data collection processes.

- Statistical analyses were performed to verify whether the tested devices detected the same traffic speed and volumes as the control device. The results clarified that of the three devices, only the Wavetronix SmartSensor HD produced similar results in traffic volume detection and the difference of the average volume detected was 0.061 vehicles per each five–minute interval. The error in detecting volume was zero percent in comparison to the volumes were detected by PRTs.
- The error in detected speeds for the iCone and Radar Recorder in comparison with the PRTs were 1.5 percent and 1.4 percent, respectively. Both devices detected the traffic speeds less than what the control device detected by 0.9 mph per interval.
- The error in detected speeds for the Wavetronix SmartSensor HD in comparison with PRTs was 2.1 percent.
- The error in detected volumes for the iCone and Radar Recorder in comparison with the PRTs were 8.6 percent and 7.8 percent, respectively. Both devices detected the traffic volumes were greater than what the control device detected by 1.8 vehicles per interval.
- The difference in detected volumes for the Wavetronix SmartSensor HD in comparison with PRTs was zero percent. This device was considered as the most accurate device in collecting traffic volume among the tested devices through this study.

- Out of the three devices, the largest reduction in speeds was observed when the Wavetronix SmartSensor HD was used. The presence of trailer with a Wavetronix SmartSensor HD appears to affect the drivers' behavior. Another alternative will be installing the trailer at a location where the trailer could be less conspicuous to the drivers and minimize its impact on the collected data.
- When the iCone was installed, increases in speeds of about five mph were recorded. It is recommended that driver surveys in the future be conducted to find on explanation for this behavior.
- While the Radar Recorder was installed, minimum increases in speeds were recorded. This can be because of the fact that the device is small in size and located more than 20 ft. from the adjacent traffic lane making it less visible from a distance.
- When the iCone was placed parallel to the adjacent traffic lane on a level segment of a road, the obtained results showed a great improvement in the accuracy of the iCone's data. The difference in detected speed data decreased from more than one mph to 0.86 mph when the iCone was present, while for volume data the error was reduced from 25 percent to 8.5 percent. These results verify that the most appropriate orientation for the iCone is parallel to adjacent traffic lane and its most appropriate location is on a two-lane level road to get the greatest accurate data by this device.
- For collecting traffic volume data only for each of adjacent traffic lane, and when individual vehicle data are not required, the Wavetronix SmartSensor HD is recommended. Although this detector requires several workers and a lot of time for installation, monitoring the traffic conditions and downloading data online could save time and provide safety.

- When collecting individual vehicle data are required, the Radar Recorder is recommended for traffic data collection. The Radar Recorder requires at least one person present frequently on site with a laptop to extract data and check the batteries or recharge them. For studies where huge amount of data are required, this can be a difficult process. It should also be considered that collecting data with the presence of the data collector could influence the driver behavior.
- As long as individual vehicle data are not required, the iCone could be a convenient option especially for short–term data collection and more specifically at work zone. The iCone is easy to install and remove. Its shape makes it suitable for work zones and its online database provides safety and saves a lot of time in traffic monitoring and extracting data.

CHAPTER 9. FUTURE RESEARCH

This study evaluated the accuracy and effects of three non-intrusive devices on the driver behavior against a very popular and but intrusive device, PRTs. Based on this research, three future studies are recommended.

- The experimental design for data collection to conduct this study was based on detecting traffic speed and volume at upstream and downstream locations where the distance between these two locations was one–half mile. A recommended future study could change this distance to realize the relation between this distance and driver behavior toward the devices deployed on the roadside at other distances.
- Future research could also focus on drivers' psychological factors related to their responses toward roadside devices taking into consideration the weather factors. This could include driver surveys or paid participants conducting drive–through with researchers in the passenger seat to observe driver actions.
- This research tested three ITS devices, which use radar wave technology. Expanding this research to include various traffic detection technologies could be another future research opportunity.

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CHAPTER 11. APPENDIX

11.1 Appendix A (iCone Data Collection)

Table A.1 East Lot at KU West Campus Experiment on May 05, 2014 for Speed (20-25) mph.

iCone					PRTs	
SN	Local Time	No. Read	Avg. Speed	Class	Speed	Veh. No.
1	10:11:00 AM	2	22	1	23	1
2	10:11:00 AM	1	22	2	23	1
3	10:11:00 AM	1	22	3	21	1
4	10:14:00 AM	1	22	1	23	1
5	10:16:00 AM	1	22	2	24	1
6	10:17:00 AM	2	22	3	24	1
7	10:18:00 AM	1	22	1	24	1
8	10:20:00 AM	2	22	2	22	1
9	10:21:00 AM	1	22	3	25	1
10	10:22:00 AM	1	22	1	22	1
11	10:24:00 AM	2	19.5	2	21	1
12	10:25:00 AM	1	27	3	25	1
13	10:26:00 AM	1	22	1	24	1
14	10:28:00 AM	1	22	2	23	1
15	10:29:00 AM	1	22	3	25	1
16	10:31:00 AM	1	22	1	21	1
17	10:32:00 AM	2	22	2	22	1
18	10:33:00 AM	1	22	3	25	1
19	10:35:00 AM	1	22	1	23	1
20	10:36:00 AM	2	22	2	23	1
21	10:37:00 AM	2	22	3	25	1
22	10:39:00 AM	1	22	1	22	1
23	10:40:00 AM	2	19.5	2	22	1
24	10:41:00 AM	2	27	3	26	1
25	10:43:00 AM	1	22	1	23	1
26	10:44:00 AM	1	22	2	24	1
27	10:46:00 AM	2	24.5	3	25	1
28	10:48:00 AM	1	22	1	22	1
29	10:49:00 AM	2	19.5	2	22	1
30	10:51:00 AM	1	22	3	24	1
31	10:52:00 AM	1	22	1	23	1
32	10:53:00 AM	2	22	2	23	1
33	10:55:00 AM	2	24.5	3	25	1
34	10:56:00 AM	1	22	1	22	1

iCone					PRTs	
SN	Local Time	No. Read	Avg. Speed	Class	Speed	Veh. No.
35	10:58:00 AM	2	22	2	23	1
36	10:59:00 AM	2	24.5	3	25	1
37	11:00:00 AM	1	22	1	23	1
38	11:02:00 AM	2	22	2	23	1
39	11:03:00 AM	2	22	3	24	1
40	11:04:00 AM	1	22	1	22	1
41	11:08:00 AM	1	22	2	23	1
42	11:09:00 AM	2	22	3	24	1
43	11:11:00 AM	1	22	1	21	1
44	11:12:00 AM	2	22	2	23	1
45	11:13:00 AM	2	22	3	24	1
46	11:15:00 AM	1	22	1	23	1
47	11:16:00 AM	2	19.5	2	23	1
48	11:17:00 AM	2	24.5	3	24	1
49	11:19:00 AM	1	22	1	24	1
50	11:20:00 AM	2	22	2	23	1
51	11:21:00 AM	2	24.5	3	25	1
Total		75	22.25		23.29	51

Table A.2 East Lot at KU West Campus Experiment on May 05, 2014 for Speed (30-35) mph.

iCone					PRTs	
SN	Local Time	No. Read	Avg. Speed	Class	Speed	Veh. No.
52	11:43:00 AM	1	32	1	34	64
53	11:45:00 AM	2	27	2	27	65
54	11:46:00 AM	1	32	3	34	66
55	11:48:00 AM	1	32	1	33	67
56	11:49:00 AM	1	32	2	33	68
57	11:51:00 AM	1	32	3	33	69
58	11:52:00 AM	1	32	1	32	70
59	11:53:00 AM	1	32	2	34	71
60	11:54:00 AM	2	29.5	3	34	72
61	11:56:00 AM	1	32	1	31	73
62	11:58:00 AM	1	32	2	33	74
63	11:59:00 AM	2	32	3	34	75
64	12:01:00 PM	1	32	1	32	76
65	12:02:00 PM	1	32	2	32	77
66	12:04:00 PM	1	32	3	34	78

iCone					PRTs	
SN	Local Time	No. Read	Avg. Speed	Class	Speed	Veh. No.
67	12:05:00 PM	1	32	1	32	79
68	12:06:00 PM	2	32	2	33	80
69	12:08:00 PM	1	32	3	32	81
70	12:09:00 PM	1	32	1	31	82
71	12:10:00 PM	1	32	2	32	83
72	12:11:00 PM	1	32	3	34	84
73	12:13:00 PM	1	32	1	31	85
74	12:14:00 PM	1	32	2	33	86
75	12:15:00 PM	2	32	3	33	87
76	12:17:00 PM	1	32	1	33	88
77	12:18:00 PM	1	32	2	33	89
78	12:20:00 PM	1	32	3	33	90
79	12:21:00 PM	1	32	1	32	91
80	12:22:00 PM	2	29.5	2	33	92
81	12:24:00 PM	2	32	3	34	93
82	12:25:00 PM	1	32	1	33	94
83	12:26:00 PM	1	32	2	33	95
84	12:27:00 PM	1	32	3	34	96
85	12:29:00 PM	1	32	1	33	97
86	12:30:00 PM	1	32	2	33	98
87	12:31:00 PM	2	32	3	33	99
88	12:33:00 PM	1	37	1	35	100
89	12:34:00 PM	1	32	2	33	101
90	12:35:00 PM	2	32	3	34	102
91	12:37:00 PM	1	32	1	33	103
92	12:38:00 PM	2	29.5	2	33	104
93	12:39:00 PM	1	32	3	34	105
94	12:41:00 PM	1	32	1	32	106
95	12:42:00 PM	1	32	2	33	107
96	12:43:00 PM	1	32	3	33	108
97	12:44:00 PM	1	32	1	32	109
98	12:46:00 PM	2	29.5	2	33	110
99	12:47:00 PM	2	32	3	34	111
Total		60	31.79		32.85	48

Table A.3 On the Vertical Curve of 15th street and Engel Rd, Lawrence, KS on June 18, 2014.

Video				iCone		Arrow
Local Time	Going Away	Coming Forward	Total	No. Reads	Avg. Speed	
9:32:05 AM	6	4	10	8	24.50	Parallel with the road
9:33:05 AM	3	4	7	6	26.17	
9:34:05 AM	4	3	7	9	26.44	
9:35:05 AM	2	4	6	8	25.13	
9:36:05 AM	7	2	9	6	20.33	
9:37:05 AM	2	2	4	5	24.00	
9:38:05 AM	5	0	5	2	27.00	
9:39:05 AM	1	0	1	7	22.00	
9:40:05 AM	6	1	7	6	23.67	
9:41:05 AM	4	2	6	9	22.56	
9:42:05 AM	6	2	8	8	27.63	
9:43:05 AM	3	4	7	5	29.00	
9:44:05 AM	7	3	10	11	23.36	
9:45:05 AM	1	4	5	8	22.00	
9:46:05 AM	7	1	8	11	22.00	
9:47:05 AM	3	5	8	9	22.00	
9:48:05 AM	8	5	13	11	23.36	
Sub-Total	75	46	121	129	24.18	

Video				iCone		Arrow
Local Time	Going Away	Coming Forward	Total	No. Reads	Avg. Speed	
9:49:05 AM	1	4	5	6	19.50	Oriented into the road 30°
9:50:05 AM	8	2	10	10	22.50	
9:51:05 AM	3	2	5	6	26.17	
9:52:05 AM	6	4	10	9	24.22	
9:53:05 AM	4	1	5	6	22.00	
9:54:05 AM	13	2	15	9	17.56	
9:55:05 AM	4	2	6	6	23.67	
9:56:05 AM	6	1	7	7	26.29	
9:57:05 AM	4	0	4	5	27.00	
9:58:05 AM	7	2	9	5	26.00	
9:59:05 AM	4	3	7	7	26.29	
10:00:05 AM	2	6	8	6	22.83	
10:01:05 AM	4	5	9	11	24.73	
10:02:05 AM	4	3	7	11	21.09	
10:03:05 AM	8	3	11	7	24.14	
10:04:05 AM	5	4	9	9	22.00	
10:05:05 AM	10	2	12	8	22.63	
10:06:05 AM	2	2	4	10	25.50	
10:07:05 AM	6	3	9	4	19.50	
10:08:05 AM	5	6	11	7	22.71	
10:09:05 AM	3	1	4	5	19.00	
10:10:05 AM	7	1	8	6	22.83	
Sub-Total	116	59	175	160	23.10	

Video				iCone		Arrow
Local Time	Going Away	Coming Forward	Total	No. Reads	Avg. Speed	
10:11:05 AM	9	6	15	4	24.50	Oriented out of the road 30°
10:12:05 AM	2	3	5	2	19.50	
10:13:05 AM	3	5	8	3	22.00	
10:14:05 AM	7	2	9	5	25.00	
10:15:05 AM	1	3	4	1	27.00	
10:16:05 AM	7	0	7	7	24.86	
10:17:05 AM	4	5	9	3	20.33	
10:18:05 AM	7	2	9	6	24.50	
10:19:05 AM	6	5	11	7	21.29	
10:20:05 AM	6	3	9	6	22.83	
10:21:05 AM	4	4	8	4	24.50	
10:22:05 AM	4	6	10	3	23.67	
10:23:05 AM	4	1	5	8	24.50	
10:24:05 AM	1	6	7	2	22.00	
10:25:05 AM	8	4	12	6	25.33	
10:26:05 AM	2	3	5	3	27.00	
10:27:05 AM	2	4	6	4	23.25	
10:28:05 AM	6	3	9	6	23.67	
10:29:05 AM	5	3	8	3	25.33	
Sub-Total	88	68	156	83	23.74	

Table A.4 Under the Vertical Curve of 15th street and Engel Rd, Lawrence, KS on June 18, 2014.

Video				iCone		Arrow
Local Time	Going Away	Coming Forward	Total	No. Reads	Avg. Speed	
9:40:00 AM	5	1	6	6	22.833	Parallel with the road
9:41:00 AM	5	3	8	12	23.25	
9:42:00 AM	6	3	9	13	27.769	
9:43:00 AM	2	2	4	11	26.091	
9:44:00 AM	7	3	10	13	26.615	
9:45:00 AM	2	5	7	12	23.25	
9:46:00 AM	5	0	5	10	24.5	
9:47:00 AM	5	6	11	11	24.727	
9:48:00 AM	7	4	11	15	25.667	
9:49:00 AM	2	4	6	11	20.636	
9:50:00 AM	6	2	8	11	22.909	
9:51:00 AM	5	2	7	12	27	
9:52:00 AM	5	4	9	12	27.417	
9:53:00 AM	4	1	5	8	23.875	
9:54:00 AM	12	3	15	9	20.333	
9:55:00 AM	5	1	6	10	24.5	
9:56:00 AM	7	1	8	8	29.5	
9:57:00 AM	4	0	4	9	25.333	
9:58:00 AM	7	3	10	9	25.889	
Total	101	48	149	202	24.84	

Video				iCone		Arrow
Local Time	Going Away	Coming Forward	Total	No. Reads	Avg. Speed	
9:59:00 AM	4	2	6	11	27.455	Oriented into the road 30°
10:00:00 AM	2	7	9	12	26.167	
10:01:00 AM	4	4	8	12	24.083	
10:02:00 AM	2	3	5	13	23.154	
10:03:00 AM	9	3	12	11	27	
10:04:00 AM	5	4	9	13	24.692	
10:05:00 AM	13	3	16	13	27	
10:06:00 AM	2	3	5	13	25.077	
10:07:00 AM	3	2	5	11	22.455	
10:08:00 AM	8	6	14	12	24.917	
10:09:00 AM	2	1	3	7	25.571	
10:10:00 AM	7	2	9	9	22.556	
10:11:00 AM	6	7	13	12	24.083	
10:12:00 AM	2	2	4	8	25.125	
10:13:00 AM	6	6	12	11	23.818	
10:14:00 AM	4	2	6	9	25.333	
10:15:00 AM	5	1	6	8	23.875	
10:16:00 AM	6	3	9	8	26.375	
10:17:00 AM	3	4	7	10	23	
Total	93	65	158	203	24.82	

Video				Icone		Arrow
Local Time	Going Away	Coming Forward	Total	No. Reads	Avg. Speed	
10:18:00 AM	8	2	10	7	24.857	Oriented out of the road 30°
10:19:00 AM	5	6	11	13	24.692	
10:20:00 AM	5	2	7	9	23.667	
10:21:00 AM	5	5	10	11	27.909	
10:22:00 AM	7	3	10	10	26.5	
10:23:00 AM	0	6	6	10	25	
10:24:00 AM	4	4	8	6	25.333	
10:25:00 AM	2	0	2	11	27	
TOTAL	36	28	64	77	25.62	

Table A.5 near Allen Fieldhouse, Lawrence, KS on June 24, 2014.

Video						iCone		
Local Time	going away		coming on		Total	No. Reads	Avg. Speed	Arrow
	Right	Left	Right	Left				
9:57	1	0	1	2	4	7	23.43	Parallel to the Road
9:58	2	1	1	0	4	0	0.00	
9:59	0	0	2	3	5	5	26.00	
10:00	1	2	0	4	7	0	0.00	
10:01	1	0	1	1	3	2	22.00	
10:02	0	0	2	3	5	0	0.00	
10:03	0	0	3	3	6	4	25.75	
10:04	1	2	2	4	9	5	20.00	
10:05	2	0	2	0	4	0	0.00	
10:06	0	0	5	1	6	5	22.00	
10:07	3	0	0	1	4	3	27.00	
10:08	2	0	2	6	10	5	23.00	
10:09	0	3	3	1	7	4	22.00	
10:10	1	3	0	2	6	6	21.17	
10:11	0	2	1	8	11	3	23.67	
10:12	2	3	2	2	9	9	20.33	
10:13	3	2	0	2	7	9	24.22	
10:14	2	2	2	1	7	3	25.33	
10:15	0	1	3	3	7	2	19.50	
10:16	1	0	0	0	1	0	0.00	
10:17	0	0	0	1	1	0	0.00	
10:18	0	2	0	1	3	10	24.00	
10:19	3	3	1	3	10	3	20.33	
10:20	1	0	2	2	5	5	21.00	
10:21	1	4	0	4	9	6	22.83	Switch off
10:22	2	1	2	0	5	3	23.67	
10:23	2	0	0	3	5	4	23.25	
10:24	0	1	0	0	1	0	0.00	
10:25	0	2	0	4	6	5	28.00	
10:26	2	2	2	2	8	7	22.00	
10:27	0	1	1	0	2	3	20.33	
10:28	1	2	1	0	4	2	22.00	
10:29	1	1	0	3	5	1	22.00	
10:30	0	0	0	3	3	0	0.00	
Total	9	14	6	19	48	31	17.49	

Video						iCone		
Local Time	going away		coming on		Total	No. Reads	Avg. Speed	Arrow
	Right	Left	Right	Left				
10:40	1	2	1	1	5	1	22.00	Oriented out of the road 30°
10:41	0	0	3	5	8	2	17.00	
10:42	3	0	0	0	3	2	22.00	
10:43	0	1	2	1	4	1	17.00	
10:44	0	1	2	1	4	1	17.00	
10:45	1	1	1	1	4	1	17.00	
10:46	1	0	0	3	4	5	22.00	
10:47	2	1	2	1	6	1	22.00	
10:48	0	1	1	3	5	0	0.00	
10:49	0	0	1	1	2	1	27.00	
10:50	2	2	1	3	8	3	20.33	
10:51	3	4	0	3	10	4	23.25	
10:52	1	1	0	3	5	3	20.33	
10:53	2	1	2	2	7	2	17.00	
10:54	1	2	0	3	6	2	22.00	
10:55	1	3	0	3	7	6	21.17	
10:56	0	5	2	0	7	0	0.00	
10:57	1	0	2	1	4	1	27.00	
10:58	2	1	0	0	3	3	20.33	
10:59	2	0	1	3	6	2	17.00	
11:00	0	1	3	1	5	2	22.00	
11:01	1	1	0	5	7	1	22.00	Switch off
11:02	0	1	0	1	2	2	22.00	
11:03	1	2	2	1	6	1	22.00	
11:04	3	2	3	1	9	3	20.33	
11:05	3	1	4	2	10	4	20.75	
11:06	3	1	1	1	6	4	23.25	
11:07	3	3	2	1	9	3	18.67	
11:08	1	5	2	1	9	3	23.67	
11:09	3	3	1	2	9	5	20.00	
Total	18	19	15	15	67	26	19.54	

Video						iCone		
Local Time	going away		coming on		Total	No. Reads	Avg. Speed	Arrow
	Right	Left	Right	Left				
11:16	0	0	0	1	1	1	17.00	Oriented out of the road 30°
11:17	2	6	3	2	13	1	22.00	
11:18	2	2	0	4	8	1	22.00	
11:19	2	2	0	4	8	0	0.00	
11:20	4	2	0	3	9	2	22.00	
11:21	2	0	0	3	5	1	22.00	
11:22	1	3	0	1	5	1	27.00	
11:23	1	3	1	2	7	0	0.00	
11:24	1	1	1	2	5	1	22.00	
11:25	2	3	0	1	6	1	17.00	
11:26	0	2	1	5	8	0	0.00	
11:27	1	1	1	3	6	1	22.00	
11:28	3	2	0	1	6	0	0.00	
11:29	3	2	1	3	9	2	24.50	
11:30	1	1	1	1	4	0	0.00	
11:31	2	2	0	4	8	2	24.50	
11:32	2	0	0	0	2	1	27.00	
11:33	2	5	1	2	10	2	24.50	
11:34	1	4	4	5	14	0	0.00	
11:35	3	2	1	5	11	0	0.00	
11:36	2	5	0	1	8	0	0.00	Switch off
11:37	1	2	1	1	5	1	22.00	
11:38	1	6	2	0	9	2	29.50	
11:39	3	3	2	2	10	2	22.00	
11:40	2	0	3	3	8	0	0.00	
11:41	0	1	0	0	1	1	17.00	
11:42	2	2	1	1	6	2	24.50	
11:43	1	2	1	0	4	1	27.00	
11:44	0	3	0	1	4	0	0.00	
11:45	2	4	0	2	8	1	17.00	
Total	14	28	10	11	63	10	15.08	

Video						iCone		
Local Time	coming on		going away		Total	No. Reads	Avg. Speed	Arrow
	Right	Left	Right	Left				
9:58:00 AM	2	1	1	0	4	5	30	Parallel to the Road
9:59:00 AM	0	0	2	3	5	6	27	
10:00:00 AM	1	2	0	4	7	10	27	
10:01:00 AM	1	0	1	1	3	8	22.63	
10:02:00 AM	0	0	2	3	5	6	27.83	
10:03:00 AM	0	0	3	3	6	6	25.33	
10:04:00 AM	1	2	2	4	9	12	25.75	
10:05:00 AM	2	0	2	0	4	7	27.71	
10:06:00 AM	0	0	5	1	6	5	21	
10:07:00 AM	3	0	0	1	4	8	26.38	
10:08:00 AM	2	0	2	6	10	9	25.33	
10:09:00 AM	0	3	3	1	7	11	25.64	
10:10:00 AM	1	3	0	2	6	8	27	
10:11:00 AM	0	2	1	8	11	11	26.09	
10:12:00 AM	2	3	2	2	9	9	28.11	
10:13:00 AM	3	2	0	2	7	8	28.25	
10:14:00 AM	2	2	2	1	7	7	30.57	
10:15:00 AM	0	1	3	3	7	11	23.82	
10:16:00 AM	1	0	0	0	1	4	28.25	
10:17:00 AM	0	0	0	1	1	2	27	
10:18:00 AM	0	2	0	1	3	6	30.33	
10:19:00 AM	3	3	1	3	10	11	26.09	
10:20:00 AM	1	0	2	2	5	6	27	
10:21:00 AM	1	4	0	4	9	8	27.63	Switch off
10:22:00 AM	2	1	2	0	5	10	28	
10:23:00 AM	2	0	0	3	5	8	27	
10:24:00 AM	0	1	0	0	1	3	25.33	
10:25:00 AM	0	2	0	4	6	5	29	
10:26:00 AM	2	2	2	2	8	8	18.88	
10:27:00 AM	0	1	1	0	2	7	24.14	
Total	32	37	39	65	173	225	26.47	

Local Time	coming on		going away		Total	No. Reads	Avg. Speed	Arrow
	Right	Left	Right	Left				
10:40:00 AM	1	2	1	1	5	6	29.5	Oriented toward going away traffic by 30° from median center
10:41:00 AM	0	0	3	5	8	11	27	
10:42:00 AM	3	0	0	0	3	2	34.5	
10:43:00 AM	0	1	2	1	4	5	30	
10:44:00 AM	0	1	2	1	4	4	24.5	
10:45:00 AM	1	1	1	1	4	2	29.5	
10:46:00 AM	1	0	0	3	4	7	27	
10:47:00 AM	2	1	2	1	6	5	21	
10:48:00 AM	0	1	1	3	5	6	29.5	
10:49:00 AM	0	0	1	1	2	7	24.86	
10:50:00 AM	2	2	1	3	8	9	28.67	
10:51:00 AM	3	4	0	3	10	9	27.56	
10:52:00 AM	1	1	0	3	5	7	29.14	
10:53:00 AM	2	1	2	2	7	8	24.5	
10:54:00 AM	1	2	0	3	6	7	27	
10:55:00 AM	1	3	0	3	7	8	26.38	
10:56:00 AM	0	5	2	0	7	6	29.50	
10:57:00 AM	1	0	2	1	4	3	28.67	
10:58:00 AM	2	1	0	0	3	4	27	
10:59:00 AM	2	0	1	3	6	7	26.29	
11:00:00 AM	0	1	3	1	5	6	24.5	
11:01:00 AM	1	1	0	5	7	6	25.33	Switch off
11:02:00 AM	0	1	0	1	2	6	28.67	
11:03:00 AM	1	2	2	1	6	5	27	
11:04:00 AM	3	2	3	1	9	7	25.57	
11:05:00 AM	3	1	4	2	10	10	25	
11:06:00 AM	3	1	1	1	6	7	28.43	
11:07:00 AM	3	3	2	1	9	8	26.38	
11:08:00 AM	1	5	2	1	9	7	27	
11:09:00 AM	3	3	1	2	9	6	27	
11:10:00 AM	3	4	0	4	11	10	27	
11:11:00 AM	3	0	1	1	5	5	29	
11:12:00 AM	2	1	2	3	8	8	25.75	
11:13:00 AM	0	2	3	1	6	5	22	
11:14:00 AM	2	2	0	0	4	4	25.75	
Total	51	55	45	63	214	223	27.04	

Video						iCone		
Local Time	coming on		going away		Total	No. Reads	Avg. Speed	Arrow
	Right	Left	Right	Left				
11:15:00 AM	0	0	0	0	0	2	22	Oriented toward coming forward traffic by 30º from median center
11:16:00 AM	0	0	0	1	1	4	25.75	
11:17:00 AM	2	6	3	2	13	8	25.75	
11:18:00 AM	2	2	0	4	8	10	26.5	
11:19:00 AM	2	2	0	4	8	11	30.64	
11:20:00 AM	4	2	0	3	9	9	27	
11:21:00 AM	2	0	0	3	5	6	25.33	
11:22:00 AM	1	3	0	1	5	8	27.63	
11:23:00 AM	1	3	1	2	7	6	30.33	
11:24:00 AM	1	1	1	2	5	8	25.75	
11:25:00 AM	2	3	0	1	6	5	29	
11:26:00 AM	0	2	1	5	8	7	28.43	
11:27:00 AM	1	1	1	3	6	9	26.44	
11:28:00 AM	3	2	0	1	6	8	27	
11:29:00 AM	3	2	1	3	9	10	30.5	
11:30:00 AM	1	1	1	1	4	4	24.5	
11:31:00 AM	2	2	0	4	8	7	29.14	
11:32:00 AM	2	0	0	0	2	8	28.88	
11:33:00 AM	2	5	1	2	10	11	30.64	
11:34:00 AM	1	4	4	5	14	6	26.17	
11:35:00 AM	3	2	1	5	11	13	27	
11:36:00 AM	2	5	0	1	8	9	31.44	Switch off
11:37:00 AM	1	2	1	1	5	7	27.71	
11:38:00 AM	1	6	2	0	9	9	30.89	
11:39:00 AM	3	3	2	2	10	8	28.88	
11:40:00 AM	2	0	3	3	8	8	25.13	
11:41:00 AM	0	1	0	0	1	5	28	
11:42:00 AM	2	2	1	1	6	6	28.67	
11:43:00 AM	1	2	1	0	4	4	33.25	
11:44:00 AM	0	3	0	1	4	6	29.5	
Total	47	67	25	61	200	222	27.93	

Table A.6 Kentucky Street, Lawrence, KS on July 8, 2014.

Video					iCone		Arrow
local Time	R. Lane	L. Lane	Parking	Total	No. Reads	Avg. Speed	
10:07:00 AM	5	2	0	7	8	23.88	30° away from traffic lane
10:08:00 AM	5	1	0	6	4	23.25	
10:09:00 AM	2	1	0	3	5	24.00	
10:10:00 AM	6	3	0	9	11	28.82	
10:11:00 AM	4	5	1	10	10	23.50	
10:12:00 AM	7	3	0	10	6	22.83	
10:13:00 AM	1	0	0	1	6	22.00	
10:14:00 AM	8	0	1	9	6	25.33	
10:15:00 AM	7	8	1	16	7	22.71	
10:16:00 AM	9	2	0	11	14	24.50	
10:17:00 AM	4	2	1	7	3	28.67	
10:18:00 AM	3	2	1	6	5	22.00	
10:19:00 AM	6	1	0	7	7	24.14	
10:20:00 AM	3	3	0	6	4	23.25	
10:21:00 AM	1	4	0	5	6	29.50	
10:27:00 AM	6	2	1	9	6	22.00	
10:28:00 AM	7	2	1	10	10	23.00	
10:29:00 AM	3	6	0	9	7	30.57	
10:30:00 AM	9	2	0	11	9	29.78	
10:31:00 AM	2	0	0	2	6	21.17	
Total	98	49	7	154	140	24.74	

Video					iCone		Arrow
local Time	R. Lane	L. Lane	Parking	Total	No. Reads	Avg. Speed	
10:41:00 AM	2	2	0	4	4	28.25	Parallel to the traffic lane
10:42:00 AM	4	3	0	7	4	25.75	
10:43:00 AM	9	1	0	10	10	25.00	
10:44:00 AM	10	1	0	11	11	24.27	
10:45:00 AM	2	2	1	5	7	24.86	
10:46:00 AM	7	1	1	9	7	26.29	
10:47:00 AM	7	3	0	10	13	23.54	
10:48:00 AM	4	4	0	8	11	27.00	
10:49:00 AM	6	3	1	10	6	22.83	
10:50:00 AM	4	4	1	9	6	25.33	
10:51:00 AM	5	2	0	7	3	28.67	
10:52:00 AM	6	5	0	11	10	25.50	
10:53:00 AM	7	3	0	10	10	29.50	
10:54:00 AM	3	1	0	4	8	28.25	
10:55:00 AM	4	0	1	5	5	24.00	
10:56:00 AM	8	3	2	13	9	24.78	
10:57:00 AM	6	2	0	8	9	23.11	
10:58:00 AM	6	7	0	13	13	27.00	
10:59:00 AM	4	3	1	8	7	27.71	
11:00:00 AM	2	1	0	3	5	25.00	
11:01:00 AM	4	3	0	7	13	26.62	
11:02:00 AM	5	3	0	8	8	23.25	
11:03:00 AM	3	3	1	7	13	26.62	
11:04:00 AM	3	1	1	5	10	26.00	
11:05:00 AM	5	1	0	6	6	20.33	
11:06:00 AM	2	4	0	6	5	28.00	
11:07:00 AM	4	1	0	5	11	23.82	
11:08:00 AM	3	1	0	4	7	24.14	
11:09:00 AM	7	5	1	13	8	21.38	
11:10:00 AM	3	4	1	8	9	21.44	
Total	145	77	12	234	239	25.27	

Video					iCone		Arrow
local Time	R. Lane	L. Lane	Parking	Total	No. Reads	Avg. Speed	
11:21:00 AM	6	2	0	8	8	24.50	30° toward the traffic lane
11:22:00 AM	4	2	1	7	10	27.00	
11:23:00 AM	4	3	0	7	7	22.71	
11:24:00 AM	5	1	0	6	5	28.00	
11:25:00 AM	8	3	1	12	8	25.75	
11:26:00 AM	5	2	0	7	10	24.50	
11:27:00 AM	3	2	0	5	12	26.58	
11:28:00 AM	7	5	1	13	6	31.17	
11:29:00 AM	9	2	1	12	12	24.08	
11:30:00 AM	3	3	0	6	10	20.50	
11:31:00 AM	5	2	0	7	9	29.78	
11:32:00 AM	6	4	0	10	8	29.50	
11:33:00 AM	12	8	0	20	10	24.50	
11:34:00 AM	5	2	1	8	8	27.00	
11:35:00 AM	8	2	0	10	9	24.78	
11:36:00 AM	5	3	0	8	11	22.00	
11:37:00 AM	5	2	0	7	13	25.08	
11:38:00 AM	7	4	1	12	9	28.67	
11:39:00 AM	6	0	0	6	8	20.75	
11:40:00 AM	4	3	1	8	11	21.55	
11:41:00 AM	7	0	1	8	5	26.00	
11:42:00 AM	3	2	2	7	10	22.50	
11:43:00 AM	1	2	1	4	8	25.75	
11:44:00 AM	3	1	0	4	7	21.29	
11:45:00 AM	7	6	0	13	6	29.50	
Total	138	66	11	215	220	25.34	

Video					iCone		Arrow
local Time	R. Lane	L. Lane	Parking	Total	No. Reads	Avg. Speed	
11:56:00 AM	4	4	1	9	6	21.17	Perpendicular to the traffic lane
11:57:00 AM	7	3	0	10	8	20.75	
11:58:00 AM	3	1	0	4	3	23.67	
11:59:00 AM	0	2	1	3	3	25.33	
12:00:00 PM	4	10	0	14	3	23.67	
12:01:00 PM	5	4	0	9	11	20.18	
12:02:00 PM	7	5	2	14	4	23.25	
12:03:00 PM	5	4	0	9	5	18.00	
12:04:00 PM	6	4	0	10	5	21.00	
12:05:00 PM	2	1	0	3	9	21.44	
12:06:00 PM	7	2	0	9	6	26.17	
12:07:00 PM	4	2	1	7	4	18.25	
12:08:00 PM	3	4	1	8	7	25.57	
12:09:00 PM	6	2	0	8	5	26.00	
12:10:00 PM	8	4	0	12	5	23.00	
12:11:00 PM	7	1	0	8	7	27.00	
12:12:00 PM	3	4	2	9	5	19.00	
12:13:00 PM	7	3	0	10	8	23.88	
12:14:00 PM	6	3	1	10	11	23.36	
12:15:00 PM	8	2	0	10	5	26.00	
12:16:00 PM	5	2	0	7	4	22.00	
12:17:00 PM	3	4	1	8	6	26.17	
12:18:00 PM	6	3	0	9	8	22.63	
12:19:00 PM	6	5	0	11	3	28.67	
12:20:00 PM	6	5	0	11	10	19.50	
Total	128	84	10	222	151	23.03	

Table A.7 Tennessee Street, Lawrence, KS on July 8, 2014.

Video				iCone		Arrow
Time	L. Lane	R. Lane	Total	No. Reads	Avg. Speed	
10:22:00 AM	3	2	5	4	28.25	30° away from traffic lane
10:23:00 AM	2	3	5	2	29.50	
10:24:00 AM	4	1	5	7	28.43	
10:25:00 AM	5	6	11	4	30.75	
10:27:00 AM	7	4	11	4	24.50	
10:28:00 AM	2	3	5	2	27.00	
10:29:00 AM	4	5	9	4	28.25	
10:30:00 AM	5	5	10	4	25.75	
10:31:00 AM	3	4	7	5	26.00	
10:32:00 AM	2	3	5	1	17.00	
10:33:00 AM	6	3	9	8	28.88	
10:34:00 AM	4	2	6	4	32.00	
10:35:00 AM	2	7	9	7	27.00	
10:36:00 AM	2	3	5	3	27.00	
10:37:00 AM	3	4	7	4	28.25	
10:38:00 AM	10	2	12	6	27.00	
10:39:00 AM	1	6	7	3	25.33	
10:40:00 AM	2	2	4	3	30.33	
10:41:00 AM	4	5	9	4	25.75	
10:42:00 AM	4	0	4	3	30.33	
10:43:00 AM	4	8	12	6	32.00	
10:44:00 AM	3	3	6	3	25.33	
10:45:00 AM	3	2	5	2	29.50	
10:46:00 AM	3	1	4	4	28.25	
10:47:00 AM	3	3	6	3	30.33	
10:48:00 AM	7	2	9	5	31.00	
10:49:00 AM	1	4	5	4	24.50	
10:50:00 AM	6	0	6	5	29.00	
10:51:00 AM	6	6	12	4	32.00	
Total	111	99	210	118	27.90	

Video				iCone		Arrow
Time	L. Lane	R. Lane	Total	No. Reads	Avg. Speed	
10:57:00 AM	6	6	12	15	26.00	Parallel to the traffic lane
10:58:00 AM	5	7	12	11	27.91	
10:59:00 AM	2	5	7	9	27.56	
11:00:00 AM	3	4	7	8	26.38	
11:01:00 AM	2	7	9	11	32.00	
11:02:00 AM	10	6	16	13	27.38	
11:03:00 AM	5	8	13	7	29.86	
11:04:00 AM	2	5	7	8	24.50	
11:05:00 AM	3	3	6	7	27.71	
11:06:00 AM	4	3	7	10	29.50	
11:07:00 AM	5	6	11	12	28.25	
11:08:00 AM	7	7	14	13	28.15	
11:09:00 AM	4	4	8	12	27.00	
11:10:00 AM	7	1	8	7	27.71	
11:11:00 AM	5	3	8	8	26.38	
11:12:00 AM	3	4	7	8	26.38	
11:13:00 AM	1	6	7	11	25.18	
11:14:00 AM	5	4	9	11	26.09	
11:15:00 AM	4	6	10	8	25.75	
11:16:00 AM	5	3	8	7	25.57	
11:17:00 AM	2	2	4	7	27.71	
11:18:00 AM	6	3	9	6	27.83	
11:19:00 AM	2	3	5	7	25.57	
11:20:00 AM	7	2	9	9	27.56	
11:21:00 AM	2	7	9	9	27.00	
11:22:00 AM	6	3	9	9	33.11	
11:23:00 AM	4	4	8	7	32.00	
11:24:00 AM	5	6	11	8	28.88	
11:25:00 AM	4	3	7	12	28.67	
11:26:00 AM	8	1	9	8	31.38	
Total	134	132	266	278	27.83	

Video				iCone		Arrow
Time	L. Lane	R. Lane	Total	No. Reads	Avg. Speed	
11:34:00 AM	3	2	5	7	26.29	30° toward the traffic lane
11:35:00 AM	5	2	7	4	24.50	
11:36:00 AM	3	0	3	5	29.00	
11:37:00 AM	8	4	12	11	23.82	
11:38:00 AM	4	7	11	8	25.75	
11:39:00 AM	4	8	12	11	26.55	
11:40:00 AM	6	5	11	7	24.86	
11:41:00 AM	7	4	11	7	29.86	
11:42:00 AM	3	4	7	10	27.00	
11:43:00 AM	4	5	9	4	20.75	
11:44:00 AM	4	4	8	10	26.00	
11:45:00 AM	4	6	10	6	26.17	
11:46:00 AM	4	5	9	7	27.00	
11:47:00 AM	3	5	8	6	25.33	
11:48:00 AM	6	2	8	7	27.71	
11:49:00 AM	4	6	10	9	28.67	
11:50:00 AM	7	2	9	9	25.89	
11:51:00 AM	5	4	9	8	24.50	
11:52:00 AM	5	4	9	9	22.00	
11:53:00 AM	6	8	14	9	27.56	
11:54:00 AM	10	3	13	10	28.00	
11:55:00 AM	9	5	14	7	23.43	
11:56:00 AM	7	5	12	9	25.33	
11:57:00 AM	5	7	12	9	25.89	
11:58:00 AM	4	3	7	7	24.14	
Total	130	110	240	196	25.84	

Video				iCone		Arrow
Time	L. Lane	R. Lane	Total	No. Reads	Avg. Speed	
12:10:00 PM	6	6	12	7	27.00	Perpendicular to the traffic lane
12:11:00 PM	4	5	9	5	25.00	
12:12:00 PM	6	2	8	9	28.11	
12:13:00 PM	4	8	12	5	29.00	
12:14:00 PM	6	0	6	8	27.63	
12:15:00 PM	6	4	10	5	28.00	
12:16:00 PM	2	2	4	6	26.17	
12:17:00 PM	6	5	11	3	23.67	
12:18:00 PM	0	2	2	1	27.00	
12:19:00 PM	2	6	8	8	28.25	
12:20:00 PM	4	8	12	10	26.00	
12:21:00 PM	6	9	15	8	25.13	
12:22:00 PM	6	7	13	7	25.57	
12:23:00 PM	6	4	10	9	27.56	
12:24:00 PM	2	5	7	7	32.00	
12:25:00 PM	5	6	11	7	29.14	
12:26:00 PM	4	3	7	5	25.00	
12:27:00 PM	3	6	9	3	27.00	
12:28:00 PM	2	4	6	4	27.00	
12:29:00 PM	5	3	8	6	27.00	
12:30:00 PM	3	6	9	6	27.00	
12:31:00 PM	6	4	10	5	26.00	
12:32:00 PM	3	6	9	7	23.43	
12:33:00 PM	5	5	10	6	27.00	
12:34:00 PM	6	0	6	6	27.00	
12:35:00 PM	6	5	11	7	27.00	
12:36:00 PM	6	4	10	9	28.67	
12:37:00 PM	6	7	13	7	27.71	
12:38:00 PM	4	4	8	5	26.00	
12:39:00 PM	2	5	7	3	28.67	
Total	132	141	273	184	26.99	

Table A.8 US 24, Williamstown, KS on July 22, 2014.

iCone-1			Arrow	Video			iCone-2			Arrow
Local Time	No. Reads	Avg. Speed		Total	oncoming	outgoing	Local Time	No. Reads	Avg. Speed	
2:25 PM	9	65.89	Parallel with the traffic flow	5	4	1	2:25 PM	3	60.33	30° toward traffic flow
2:26 PM	11	59.27		11	4	7	2:26 PM	8	55.75	
2:27 PM	7	62		12	2	10	2:27 PM	7	57	
2:28 PM	9	66.44		5	2	3	2:28 PM	4	57	
2:29 PM	8	54.5		5	0	5	2:29 PM	6	48.67	
2:30 PM	7	61.29		6	3	3	2:30 PM	3	57	
2:31 PM	3	55.33		3	3	0	2:31 PM	6	50.33	
2:32 PM	9	62		5	1	4	2:32 PM	4	62	
2:33 PM	9	62.56		10	1	9	2:33 PM	9	50.33	
2:34 PM	4	59.5		3	2	1	2:34 PM	3	47	
2:35 PM	4	63.25		5	2	3	2:35 PM	4	63.25	
2:36 PM	6	64.5		5	3	2	2:36 PM	4	59.5	
2:37 PM	5	49		4	2	2	2:37 PM	5	66	
2:38 PM	5	58		5	4	1	2:38 PM	1	57	
2:39 PM	7	61.29		9	3	6	2:39 PM	8	57	
2:40 PM	3	60.33		1	1	0	2:40 PM	4	60.75	
2:41 PM	6	64.5		3	0	3	2:41 PM	3	50.33	
2:42 PM	3	68.67		2	2	0	2:42 PM	1	32	
2:43 PM	4	65.75		5	5	0	2:43 PM	2	69.5	
2:44 PM	8	50.13		7	6	1	2:44 PM	4	53.25	
2:45 PM	7	58.43		7	3	4	2:45 PM	6	43.67	
2:46 PM	7	57.71		7	4	3	2:46 PM	6	49.5	
2:47 PM	6	59.5		5	0	5	2:47 PM	7	54.86	
2:48 PM	10	57.5		9	3	6	2:48 PM	6	41.17	
2:49 PM	4	59.5		3	0	3	2:49 PM	9	58.67	
Total	161	60.27		142	60	82	Total	123	54.47	

iCone-1			Arrow	Video			iCone-2			Arrow
Local Time	No. Reads	Avg. Speed		Total	oncoming	outgoing	Local Time	No. Reads	Avg. Speed	
3:05 PM	5	65	Parallel with the traffic flow	6	2	4	3:05 PM	4	64.5	30° away from traffic flow
3:06 PM	4	60.75		4	0	4	3:06 PM	3	58.67	
3:07 PM	5	61		5	3	2	3:07 PM	3	50.33	
3:08 PM	10	61		7	3	4	3:08 PM	6	61.17	
3:09 PM	8	65.75		6	3	3	3:09 PM	5	62	
3:10 PM	8	60.75		7	5	2	3:10 PM	8	66.38	
3:11 PM	10	67		7	1	6	3:11 PM	6	53.67	
3:12 PM	8	59.5		8	3	5	3:12 PM	7	61.29	
3:13 PM	4	58.25		6	1	5	3:13 PM	6	54.5	
3:14 PM	11	60.18		10	8	2	3:14 PM	2	64.5	
3:15 PM	5	62		7	1	6	3:15 PM	8	60.13	
3:16 PM	6	63.67		2	0	2	3:16 PM	4	62	
3:17 PM	9	61.44		7	4	3	3:17 PM	8	59.5	
3:18 PM	4	57		7	1	6	3:18 PM	3	55.33	
3:19 PM	5	60		5	4	1	3:19 PM	5	59	
3:20 PM	5	59		6	0	6	3:20 PM	8	45.75	
3:21 PM	13	62.38		15	5	10	3:21 PM	6	54.5	
3:22 PM	12	62.83		9	2	7	3:22 PM	9	53.67	
3:23 PM	2	54.5		3	2	1	3:23 PM	2	57	
3:24 PM	7	59.14		8	3	5	3:24 PM	8	58.25	
3:25 PM	2	64.5		2	0	2	3:25 PM	2	59.5	
3:26 PM	9	62		8	6	2	3:26 PM	7	62	
3:27 PM	3	60.33		4	0	4	3:27 PM	3	55.33	
3:28 PM	11	62.45		9	6	3	3:28 PM	5	54	
3:29 PM	3	55.33		2	0	2	3:29 PM	7	62	
3:30 PM	9	64.78		7	0	7	3:30 PM	5	62	
3:31 PM	7	61.29		6	4	2	3:31 PM	4	47	
3:32 PM	9	62.56		7	4	3	3:32 PM	6	59.5	
3:33 PM	10	62.5		10	5	5	3:33 PM	10	58	
3:34 PM	9	63.67		10	5	5	3:34 PM	6	60.33	
Total	213	61.35		200	81	119	Total	166	58.06	

Table A.9 US 56 near Burlingame and Scranton, KS on August 5, 2014.

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:16 AM	1	1	0	1	9:52 AM	1	0	0	0
9:17 AM	3	3	0	3	9:53 AM	0	0	3	3
9:18 AM	2	0	0	0	9:54 AM	6	1	3	4
9:19 AM	1	1	1	2	9:55 AM	5	3	0	3
9:20 AM	1	0	0	0	9:56 AM	1	0	0	0
9:21 AM	0	1	0	1	9:57 AM	0	1	0	1
9:22 AM	1	0	0	0	9:58 AM	1	0	0	0
9:23 AM	4	0	5	5	9:59 AM	1	1	0	1
9:24 AM	0	0	0	0	10:00 AM	0	1	0	1
9:25 AM	1	1	0	1	10:01 AM	0	0	0	0
9:26 AM	0	0	0	0	10:02 AM	0	0	0	0
9:27 AM	0	0	0	0	10:03 AM	3	0	0	0
9:28 AM	3	1	1	2	10:04 AM	5	2	1	3
9:29 AM	0	1	0	1	10:05 AM	1	1	3	4
9:30 AM	6	2	0	2	10:06 AM	1	2	0	2
9:31 AM	0	0	0	0	10:07 AM	2	0	0	0
9:32 AM	1	1	0	1	10:08 AM	3	2	1	3
9:33 AM	5	2	3	5	10:09 AM	0	0	1	1
9:34 AM	1	0	0	0	10:10 AM	0	0	0	0
9:35 AM	2	1	0	1	10:11 AM	2	1	0	1
9:36 AM	0	0	0	0	10:12 AM	1	0	0	0
9:37 AM	0	0	0	0	10:13 AM	0	1	0	1
9:38 AM	0	0	0	0	10:14 AM	1	0	0	0
9:39 AM	1	1	0	1	10:15 AM	2	1	0	1
9:40 AM	0	0	0	0	10:16 AM	2	1	3	4
9:41 AM	1	1	0	1	10:17 AM	1	0	0	0
9:42 AM	1	0	1	1	10:18 AM	0	1	0	1
9:43 AM	2	0	1	1	10:19 AM	0	0	0	0
9:44 AM	7	1	7	8	10:20 AM	1	0	0	0
9:45 AM	1	1	0	1	10:21 AM	4	3	1	4
9:46 AM	1	0	1	1	10:22 AM	0	0	0	0
9:47 AM	2	1	0	1	10:23 AM	3	1	0	1
9:48 AM	1	2	0	2	10:24 AM	0	1	0	1
9:49 AM	1	0	0	0	10:25 AM	0	0	0	0
9:50 AM	1	0	2	2	10:26 AM	0	0	0	0
9:51 AM	4	2	1	3	10:27 AM	6	1	7	8

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:28 AM	0	0	1	1	11:04 AM	0	0	1	1
10:29 AM	3	1	0	1	11:05 AM	1	1	0	1
10:30 AM	3	2	1	3	11:06 AM	1	1	0	1
10:31 AM	0	1	0	1	11:07 AM	0	0	0	0
10:32 AM	4	3	0	3	11:08 AM	3	1	0	1
10:33 AM	5	0	1	1	11:09 AM	6	0	8	8
10:34 AM	1	3	1	4	11:10 AM	0	0	0	0
10:35 AM	0	0	0	0	11:11 AM	1	1	0	1
10:36 AM	0	0	0	0	11:12 AM	0	0	0	0
10:37 AM	0	0	0	0	11:13 AM	2	0	0	0
10:38 AM	5	0	4	4	11:14 AM	3	4	0	4
10:39 AM	1	0	0	0	11:15 AM	0	0	0	0
10:40 AM	3	3	0	3	11:16 AM	3	2	0	2
10:41 AM	0	0	0	0	11:17 AM	4	1	0	1
10:42 AM	0	0	0	0	11:18 AM	0	0	2	2
10:43 AM	1	0	0	0	11:19 AM	1	1	0	1
10:44 AM	0	0	1	1	11:20 AM	0	0	0	0
10:45 AM	0	0	0	0	11:21 AM	3	0	0	0
10:46 AM	1	1	0	1	11:22 AM	0	1	1	2
10:47 AM	2	0	0	0	11:23 AM	0	0	0	0
10:48 AM	4	1	1	2	11:24 AM	1	0	0	0
10:49 AM	8	3	7	10	11:25 AM	0	1	0	1
10:50 AM	0	0	0	0	11:26 AM	8	1	6	7
10:51 AM	0	0	0	0	11:27 AM	2	2	2	4
10:52 AM	1	0	0	0	11:28 AM	0	0	0	0
10:53 AM	0	1	0	1	11:29 AM	2	0	0	0
10:54 AM	0	0	0	0	11:30 AM	0	1	0	1
10:55 AM	1	1	0	1	11:31 AM	1	0	0	0
10:56 AM	0	0	0	0	11:32 AM	2	1	0	1
10:57 AM	0	0	0	0	11:33 AM	0	1	0	1
10:58 AM	2	1	0	1	11:34 AM	4	1	4	5
10:59 AM	3	0	0	0	11:35 AM	1	0	0	0
11:00 AM	0	0	3	3	11:36 AM	1	0	2	2
11:01 AM	2	0	0	0	Total	209	93	92	185
11:03 AM	1	0	0	0					

Table A.10 US 56 near Burlingame and Scranton, KS on August 6, 2014.

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
8:35 AM	0	0	0	0	9:11 AM	0	0	0	0
8:36 AM	4	3	0	3	9:12 AM	0	0	0	0
8:37 AM	3	1	0	1	9:13 AM	0	0	0	0
8:38 AM	4	2	0	2	9:14 AM	0	0	0	0
8:39 AM	0	0	1	1	9:15 AM	0	0	0	0
8:40 AM	2	0	0	0	9:16 AM	0	0	0	0
8:41 AM	0	0	0	0	9:17 AM	10	0	9	9
8:42 AM	5	1	4	5	9:18 AM	0	0	0	0
8:43 AM	2	1	0	1	9:19 AM	2	1	0	1
8:44 AM	2	1	0	1	9:20 AM	1	1	0	1
8:45 AM	0	0	0	0	9:21 AM	1	0	0	0
8:46 AM	0	1	0	1	9:22 AM	0	0	0	0
8:47 AM	2	0	0	0	9:23 AM	0	0	0	0
8:48 AM	0	0	0	0	9:24 AM	0	0	0	0
8:49 AM	0	0	1	1	9:25 AM	0	0	0	0
8:50 AM	2	0	0	0	9:26 AM	0	1	0	1
8:51 AM	0	0	0	0	9:27 AM	4	0	1	1
8:52 AM	0	0	0	0	9:28 AM	0	0	0	0
8:53 AM	0	0	3	3	9:29 AM	2	1	11	12
8:54 AM	3	0	0	0	9:30 AM	10	0	1	1
8:55 AM	0	0	0	0	9:31 AM	0	1	0	1
8:56 AM	0	0	0	0	9:32 AM	2	1	0	1
8:57 AM	3	2	0	2	9:33 AM	1	0	0	0
8:58 AM	0	0	0	0	9:34 AM	3	1	0	1
8:59 AM	0	0	0	0	9:35 AM	0	0	0	0
9:00 AM	0	0	0	0	9:36 AM	4	2	0	2
9:01 AM	1	0	1	1	9:37 AM	3	1	0	1
9:02 AM	0	0	0	0	9:38 AM	0	0	0	0
9:03 AM	0	0	0	0	9:39 AM	1	0	0	0
9:04 AM	1	1	3	4	9:40 AM	0	1	0	1
9:05 AM	5	0	1	1	9:41 AM	10	0	11	11
9:06 AM	1	1	0	1	9:42 AM	5	1	0	1
9:07 AM	1	1	0	1	9:43 AM	4	1	1	2
9:08 AM	3	2	0	2	9:44 AM	2	0	0	0
9:09 AM	2	0	0	0	9:45 AM	0	0	0	0
9:10 AM	0	0	0	0	9:46 AM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:47 AM	2	2	0	2	10:23 AM	0	0	0	0
9:48 AM	3	0	0	0	10:24 AM	0	1	0	1
9:49 AM	0	1	0	1	10:25 AM	3	1	0	1
9:50 AM	3	0	0	0	10:26 AM	1	0	0	0
9:51 AM	0	1	0	1	10:27 AM	2	3	1	4
9:52 AM	2	0	0	0	10:28 AM	5	0	0	0
9:53 AM	2	0	9	9	10:29 AM	0	0	1	1
9:54 AM	5	0	0	0	10:30 AM	1	0	0	0
9:55 AM	0	0	0	0	10:31 AM	3	0	8	8
9:56 AM	1	1	0	1	10:32 AM	5	0	0	0
9:57 AM	2	0	0	0	10:33 AM	2	4	0	4
9:58 AM	0	1	0	1	10:34 AM	5	1	0	1
9:59 AM	4	1	0	1	10:35 AM	1	0	0	0
10:00 AM	0	0	0	0	10:36 AM	0	0	0	0
10:01 AM	2	0	1	1	10:37 AM	1	0	0	0
10:02 AM	0	0	0	0	10:38 AM	0	0	1	1
10:03 AM	0	0	0	0	10:39 AM	2	1	0	1
10:04 AM	0	0	5	5	10:40 AM	4	2	0	2
10:05 AM	6	1	0	1	10:41 AM	1	0	0	0
10:06 AM	1	1	0	1	10:42 AM	0	0	0	0
10:07 AM	3	3	0	3	10:43 AM	2	0	4	4
10:08 AM	2	1	0	1	10:44 AM	4	1	0	1
10:09 AM	2	0	0	0	10:45 AM	2	0	0	0
10:10 AM	0	0	0	0	10:46 AM	1	0	0	0
10:11 AM	1	1	0	1	10:47 AM	0	0	0	0
10:12 AM	0	0	0	0	10:48 AM	0	1	0	1
10:13 AM	0	0	0	0	10:49 AM	2	0	0	0
10:14 AM	0	1	0	1	10:50 AM	0	0	0	0
10:15 AM	3	0	0	0	10:51 AM	0	1	0	1
10:16 AM	0	0	0	0	10:52 AM	2	0	0	0
10:17 AM	0	1	5	6	10:53 AM	0	0	0	0
10:18 AM	6	0	0	0	10:54 AM	0	0	0	0
10:19 AM	0	1	0	1	10:55 AM	0	2	0	2
10:20 AM	2	4	0	4	10:56 AM	2	0	0	0
10:21 AM	6	0	0	0	10:57 AM	0	0	4	4
10:22 AM	0	0	0	0	10:58 AM	6	0	2	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:59 AM	1	0	0	0	11:35 AM	1	0	3	3
11:00 AM	1	0	0	0	11:36 AM	4	3	0	3
11:01 AM	0	0	0	0	11:37 AM	3	0	0	0
11:02 AM	0	0	0	0	11:38 AM	0	1	0	1
11:03 AM	1	0	0	0	11:39 AM	2	2	0	2
11:04 AM	2	0	0	0	11:40 AM	4	0	0	0
11:05 AM	3	1	0	1	11:41 AM	1	1	0	1
11:06 AM	0	0	0	0	11:42 AM	2	1	0	1
11:07 AM	0	0	0	0	11:43 AM	1	1	0	1
11:08 AM	0	0	1	1	11:44 AM	1	0	0	0
11:09 AM	1	0	0	0	11:45 AM	0	0	0	0
11:10 AM	4	0	8	8	11:46 AM	1	0	0	0
11:11 AM	6	1	0	1	11:47 AM	0	1	0	1
11:12 AM	2	3	0	3	11:48 AM	2	0	2	2
11:13 AM	5	0	0	0	11:49 AM	3	1	1	2
11:14 AM	0	1	0	1	11:50 AM	3	1	0	1
11:15 AM	1	0	0	0	11:51 AM	2	0	0	0
11:16 AM	0	1	0	1	11:52 AM	0	1	0	1
11:17 AM	2	0	0	0	11:53 AM	1	0	0	0
11:18 AM	0	1	1	2	11:54 AM	0	0	0	0
11:19 AM	3	0	0	0	11:55 AM	0	1	0	1
11:20 AM	0	1	0	1	11:56 AM	4	1	0	1
11:21 AM	3	3	1	4	11:57 AM	2	1	0	1
11:22 AM	5	0	4	4	11:58 AM	2	0	0	0
11:23 AM	7	0	0	0	11:59 AM	0	0	0	0
11:24 AM	0	1	0	1	12:00 PM	1	1	0	1
11:25 AM	2	0	0	0	12:01 PM	4	2	0	2
11:26 AM	0	0	0	0	12:02 PM	2	0	6	6
11:27 AM	0	1	0	1	12:03 PM	8	1	1	2
11:28 AM	3	2	0	2	12:04 PM	3	2	0	2
11:29 AM	3	1	0	1	12:05 PM	4	0	1	1
11:30 AM	3	1	0	1	12:06 PM	1	1	0	1
11:31 AM	0	0	0	0	12:07 PM	6	0	0	0
11:32 AM	0	1	0	1	12:08 PM	0	1	0	1
11:33 AM	2	1	0	1	12:09 PM	2	1	0	1
11:34 AM	4	0	0	0	12:10 PM	2	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:11 PM	0	0	0	0	12:47 PM	0	0	0	0
12:12 PM	0	1	0	1	12:48 PM	0	1	0	1
12:13 PM	3	0	0	0	12:49 PM	2	0	0	0
12:14 PM	0	0	0	0	12:50 PM	0	0	0	0
12:15 PM	1	0	3	3	12:51 PM	0	1	0	1
12:16 PM	3	0	0	0	12:52 PM	4	0	0	0
12:17 PM	0	1	0	1	12:53 PM	1	1	1	2
12:18 PM	2	0	0	0	12:54 PM	2	0	0	0
12:19 PM	0	0	2	2	12:55 PM	2	2	8	10
12:20 PM	2	0	0	0	12:56 PM	7	4	0	4
12:21 PM	0	1	0	1	12:57 PM	6	0	0	0
12:22 PM	6	0	0	0	12:58 PM	0	0	0	0
12:23 PM	0	1	0	1	12:59 PM	0	0	0	0
12:24 PM	2	0	0	0	1:00 PM	0	1	1	2
12:25 PM	0	0	0	0	1:01 PM	3	0	0	0
12:26 PM	4	3	0	3	1:02 PM	1	4	0	4
12:27 PM	2	0	0	0	1:03 PM	6	2	0	2
12:28 PM	3	1	4	5	1:04 PM	3	1	0	1
12:29 PM	4	3	0	3	1:05 PM	2	0	1	1
12:30 PM	6	0	0	0	1:06 PM	1	1	0	1
12:31 PM	0	0	0	0	1:07 PM	2	0	0	0
12:32 PM	0	0	0	0	1:08 PM	0	0	4	4
12:33 PM	0	0	0	0	1:09 PM	4	1	0	1
12:34 PM	0	0	0	0	1:10 PM	2	2	0	2
12:35 PM	2	2	0	2	1:11 PM	2	0	0	0
12:36 PM	3	1	0	1	1:12 PM	0	0	0	0
12:37 PM	0	1	0	1	1:13 PM	0	0	0	0
12:38 PM	2	0	1	1	1:14 PM	0	2	0	2
12:39 PM	4	1	0	1	1:15 PM	6	0	0	0
12:40 PM	3	0	1	1	1:16 PM	0	1	0	1
12:41 PM	0	0	1	1	1:17 PM	5	0	0	0
12:42 PM	3	1	3	4	1:18 PM	2	1	0	1
12:43 PM	2	1	0	1	1:19 PM	0	0	0	0
12:44 PM	2	0	0	0	1:20 PM	2	2	0	2
12:45 PM	1	1	0	1	1:21 PM	0	0	6	6
12:46 PM	1	0	0	0	1:22 PM	8	2	0	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
1:23 PM	3	1	0	1	1:59 PM	6	2	3	5
1:24 PM	2	0	0	0	2:00 PM	0	0	0	0
1:25 PM	1	0	0	0	2:01 PM	2	1	0	1
1:26 PM	0	0	0	0	2:02 PM	2	1	0	1
1:27 PM	0	1	0	1	2:03 PM	0	0	0	0
1:28 PM	4	1	0	1	2:04 PM	0	0	0	0
1:29 PM	1	0	0	0	2:05 PM	1	1	0	1
1:30 PM	0	0	0	0	2:06 PM	0	0	0	0
1:31 PM	0	0	0	0	2:07 PM	0	0	0	0
1:32 PM	0	0	0	0	2:08 PM	1	1	0	1
1:33 PM	0	2	6	8	2:09 PM	0	0	0	0
1:34 PM	6	0	0	0	2:10 PM	1	0	0	0
1:35 PM	1	0	0	0	2:11 PM	4	0	5	5
1:36 PM	0	1	0	1	2:12 PM	3	1	0	1
1:37 PM	1	0	0	0	2:13 PM	4	3	0	3
1:38 PM	0	0	0	0	2:14 PM	2	0	0	0
1:39 PM	0	0	0	0	2:15 PM	0	0	0	0
1:40 PM	0	1	0	1	2:16 PM	0	0	0	0
1:41 PM	2	0	0	0	2:17 PM	0	0	0	0
1:42 PM	1	3	0	3	2:18 PM	2	1	0	1
1:43 PM	2	0	0	0	2:19 PM	0	0	0	0
1:44 PM	0	0	0	0	2:20 PM	0	0	0	0
1:45 PM	0	1	2	3	2:21 PM	0	0	0	0
1:46 PM	3	0	4	4	2:22 PM	1	0	1	1
1:47 PM	5	1	0	1	2:23 PM	0	0	0	0
1:48 PM	1	0	0	0	Total	573	191	181	372
1:49 PM	0	0	0	0					
1:50 PM	0	1	0	1					
1:51 PM	1	1	0	1					
1:52 PM	2	0	0	0					
1:53 PM	0	2	1	3					
1:54 PM	5	0	0	0					
1:55 PM	0	1	0	1					
1:56 PM	1	0	0	0					
1:57 PM	0	1	0	1					
1:58 PM	6	0	5	5					

Table A.11 US 56 near Burlingame and Scranton, KS on August 7, 2014.

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:41 AM	0	0	0	0	10:17 AM	0	0	0	0
9:42 AM	0	0	0	0	10:18 AM	2	1	0	1
9:43 AM	0	0	0	0	10:19 AM	12	0	3	3
9:44 AM	3	2	0	2	10:20 AM	1	0	0	0
9:45 AM	1	0	0	0	10:21 AM	0	0	0	0
9:46 AM	0	1	0	1	10:22 AM	0	0	0	0
9:47 AM	2	3	4	7	10:23 AM	0	0	0	0
9:48 AM	9	0	0	0	10:24 AM	0	0	0	0
9:49 AM	0	0	0	0	10:25 AM	0	0	0	0
9:50 AM	0	2	0	2	10:26 AM	0	0	0	0
9:51 AM	5	0	0	0	10:27 AM	0	0	0	0
9:52 AM	0	0	0	0	10:28 AM	6	2	0	2
9:53 AM	0	1	0	1	10:29 AM	1	0	0	0
9:54 AM	5	0	0	0	10:30 AM	4	0	4	4
9:55 AM	0	1	0	1	10:31 AM	2	0	0	0
9:56 AM	3	0	0	0	10:32 AM	0	0	0	0
9:57 AM	0	0	0	0	10:33 AM	0	0	0	0
9:58 AM	0	0	10	10	10:34 AM	4	1	0	1
9:59 AM	9	1	0	1	10:35 AM	0	0	0	0
10:00 AM	4	0	0	0	10:36 AM	0	0	0	0
10:01 AM	0	0	0	0	10:37 AM	0	0	0	0
10:02 AM	0	2	0	2	10:38 AM	5	1	1	2
10:03 AM	5	0	0	0	10:39 AM	3	1	0	1
10:04 AM	0	0	0	0	10:40 AM	2	1	0	1
10:05 AM	0	0	0	0	10:41 AM	0	0	0	0
10:06 AM	0	0	0	0	10:42 AM	12	1	5	6
10:07 AM	0	0	0	0	10:43 AM	4	2	0	2
10:08 AM	5	0	3	3	10:44 AM	3	0	0	0
10:09 AM	0	0	0	0	10:45 AM	0	0	0	0
10:10 AM	3	1	0	1	10:46 AM	2	1	0	1
10:11 AM	0	0	0	0	10:47 AM	2	0	1	1
10:12 AM	3	0	1	1	10:48 AM	1	0	0	0
10:13 AM	5	1	1	2	10:49 AM	3	1	0	1
10:14 AM	3	1	1	2	10:50 AM	3	1	0	1
10:15 AM	0	0	0	0	10:51 AM	0	0	0	0
10:16 AM	5	2	1	3	10:52 AM	5	1	0	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:53 AM	6	0	4	4	11:29 AM	11	1	6	7
10:54 AM	6	0	5	5	11:30 AM	0	0	0	0
10:55 AM	0	0	0	0	11:31 AM	0	0	0	0
10:56 AM	3	0	1	1	11:32 AM	2	1	0	1
10:57 AM	1	0	0	0	11:33 AM	0	0	0	0
10:58 AM	5	1	1	2	11:34 AM	0	0	0	0
10:59 AM	2	1	0	1	11:35 AM	3	0	2	2
11:00 AM	2	1	0	1	1:33 PM	7	2	0	2
11:01 AM	3	1	0	1	1:34 PM	2	3	0	3
11:02 AM	5	1	1	2	1:35 PM	3	1	0	1
11:03 AM	0	0	0	0	1:36 PM	3	1	0	1
11:04 AM	5	2	0	2	1:37 PM	4	2	0	2
11:05 AM	11	1	9	10	1:38 PM	7	0	8	8
11:06 AM	7	0	1	1	1:39 PM	5	2	0	2
11:07 AM	0	0	0	0	1:40 PM	2	2	0	2
11:08 AM	0	0	0	0	1:41 PM	9	1	1	2
11:09 AM	0	1	0	1	1:42 PM	0	0	0	0
11:10 AM	2	0	0	0	1:43 PM	5	3	0	3
11:11 AM	0	0	0	0	1:44 PM	6	0	0	0
11:12 AM	0	0	0	0	1:45 PM	0	0	0	0
11:13 AM	0	0	0	0	1:46 PM	0	2	0	2
11:14 AM	0	0	0	0	1:47 PM	4	1	3	4
11:15 AM	0	0	0	0	1:48 PM	8	2	0	2
11:16 AM	3	1	0	1	1:49 PM	2	3	0	3
11:17 AM	7	1	4	5	1:50 PM	3	0	0	0
11:18 AM	3	1	0	1	1:51 PM	0	0	0	0
11:19 AM	0	0	0	0	1:52 PM	3	1	1	2
11:20 AM	0	0	0	0	1:53 PM	2	2	0	2
11:21 AM	0	0	0	0	1:54 PM	2	0	0	0
11:22 AM	0	0	0	0	1:55 PM	3	1	0	1
11:23 AM	0	0	0	0	1:56 PM	0	0	0	0
11:24 AM	0	0	0	0	1:57 PM	0	1	0	1
11:25 AM	4	1	0	1	1:58 PM	3	1	12	13
11:26 AM	0	0	0	0	1:59 PM	7	1	0	1
11:27 AM	0	0	0	0	2:00 PM	1	0	0	0
11:28 AM	1	0	2	2	2:01 PM	4	1	0	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:02 PM	0	2	0	2	2:38 PM	5	2	0	2
2:03 PM	4	2	0	2	2:39 PM	0	1	0	1
2:04 PM	9	3	0	3	2:40 PM	1	1	0	1
2:05 PM	2	1	0	1	2:41 PM	2	1	0	1
2:06 PM	2	4	0	4	2:42 PM	4	1	0	1
2:07 PM	6	0	0	0	2:43 PM	6	1	0	1
2:08 PM	0	0	7	7	2:44 PM	0	1	0	1
2:09 PM	9	3	0	3	2:45 PM	5	1	1	2
2:10 PM	0	0	0	0	2:46 PM	2	0	0	0
2:11 PM	0	1	0	1	2:47 PM	0	0	0	0
2:12 PM	4	3	0	3	2:48 PM	0	1	0	1
2:13 PM	2	0	0	0	2:49 PM	1	1	0	1
2:14 PM	1	2	0	2	2:50 PM	2	0	0	0
2:15 PM	2	0	0	0	2:51 PM	0	0	0	0
2:16 PM	0	0	0	0	2:52 PM	0	2	6	8
2:17 PM	0	0	0	0	2:53 PM	9	0	2	2
2:18 PM	0	0	0	0	2:54 PM	1	2	0	2
2:19 PM	0	1	0	1	2:55 PM	3	2	0	2
2:20 PM	2	0	1	1	2:56 PM	2	1	0	1
2:21 PM	5	3	13	16	2:57 PM	5	2	0	2
2:22 PM	7	1	0	1	2:58 PM	2	1	0	1
2:23 PM	3	1	0	1	2:59 PM	2	3	0	3
2:24 PM	4	1	0	1	3:00 PM	7	0	0	0
2:25 PM	2	1	0	1	3:01 PM	3	3	0	3
2:26 PM	0	2	0	2	3:02 PM	6	0	0	0
2:27 PM	5	1	0	1	3:03 PM	0	0	9	9
2:28 PM	2	1	0	1	3:04 PM	13	2	2	4
2:29 PM	1	1	0	1	3:05 PM	2	0	1	1
2:30 PM	1	0	0	0	3:06 PM	3	1	0	1
2:31 PM	0	0	7	7	3:07 PM	2	1	0	1
2:32 PM	8	0	0	0	3:08 PM	1	0	1	1
2:33 PM	2	4	0	4	3:09 PM	2	0	0	0
2:34 PM	7	2	0	2	3:10 PM	0	0	0	0
2:35 PM	0	1	0	1	3:11 PM	0	1	0	1
2:36 PM	2	1	0	1	3:12 PM	1	0	0	0
2:37 PM	1	0	0	0	3:13 PM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
3:14 PM	0	0	8	8	3:50 PM	3	3	8	11
3:15 PM	9	2	1	3	3:51 PM	9	1	3	4
3:16 PM	4	1	0	1	3:52 PM	3	2	0	2
3:17 PM	2	2	0	2	3:53 PM	4	1	0	1
3:18 PM	0	3	0	3	3:54 PM	3	4	1	5
3:19 PM	6	1	0	1	3:55 PM	8	1	0	1
3:20 PM	4	2	0	2	3:56 PM	2	1	0	1
3:21 PM	2	2	0	2	3:57 PM	4	4	0	4
3:22 PM	2	1	0	1	3:58 PM	7	5	0	5
3:23 PM	7	3	0	3	3:59 PM	8	0	0	0
3:24 PM	0	0	0	0	4:00 PM	3	2	0	2
3:25 PM	0	1	0	1	4:01 PM	2	1	0	1
3:26 PM	6	1	8	9	4:02 PM	2	2	0	2
3:27 PM	5	0	0	0	4:03 PM	3	1	10	11
3:28 PM	0	1	0	1	4:04 PM	11	2	5	7
3:29 PM	1	1	0	1	4:05 PM	9	0	0	0
3:30 PM	2	3	0	3	4:06 PM	0	0	1	1
3:31 PM	4	1	0	1	4:07 PM	1	1	1	2
3:32 PM	2	0	0	0	4:08 PM	1	1	0	1
3:33 PM	0	1	0	1	4:09 PM	4	0	0	0
3:34 PM	2	1	0	1	4:10 PM	4	3	0	3
3:35 PM	2	2	0	2	4:11 PM	2	1	0	1
3:36 PM	7	3	0	3	4:12 PM	6	2	0	2
3:37 PM	6	1	0	1	4:13 PM	8	6	0	6
3:38 PM	0	0	12	12	4:14 PM	9	5	0	5
3:39 PM	6	0	0	0	4:15 PM	10	6	0	6
3:40 PM	0	3	0	3	4:16 PM	7	3	2	5
3:41 PM	7	3	0	3	4:17 PM	2	1	3	4
3:42 PM	4	0	0	0	4:18 PM	4	2	0	2
3:43 PM	1	2	0	2	4:19 PM	6	3	0	3
3:44 PM	2	2	0	2	4:20 PM	8	3	0	3
3:45 PM	2	0	0	0	4:21 PM	3	1	1	2
3:46 PM	7	2	0	2	4:22 PM	10	5	1	6
3:47 PM	3	1	0	1	4:23 PM	4	2	1	3
3:48 PM	2	1	1	2	4:24 PM	4	1	0	1
3:49 PM	2	0	0	0	4:25 PM	4	3	0	3

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
4:26 PM	5	2	1	3	5:02 PM	3	2	0	2
4:27 PM	2	1	0	1	5:03 PM	3	1	0	1
4:28 PM	7	4	0	4	5:04 PM	0	0	0	0
4:29 PM	3	1	1	2	5:05 PM	3	1	0	1
4:30 PM	7	3	2	5	5:06 PM	5	2	3	5
4:31 PM	10	2	0	2	5:07 PM	7	2	6	8
4:32 PM	3	1	0	1	5:08 PM	5	3	0	3
4:33 PM	6	2	1	3	5:09 PM	5	3	0	3
4:34 PM	7	4	0	4	5:10 PM	0	0	0	0
4:35 PM	7	4	0	4	5:11 PM	5	3	0	3
4:36 PM	6	2	1	3	5:12 PM	10	2	1	3
4:37 PM	3	1	1	2	5:13 PM	6	3	1	4
4:38 PM	4	2	0	2	5:14 PM	8	3	0	3
4:39 PM	5	3	0	3	5:15 PM	2	2	0	2
4:40 PM	0	0	0	0	5:16 PM	2	2	0	2
4:41 PM	5	2	1	3	5:17 PM	4	1	0	1
4:42 PM	11	5	10	15	5:18 PM	6	3	0	3
4:43 PM	3	0	2	2	5:19 PM	7	1	3	4
4:44 PM	1	0	0	0	5:20 PM	8	6	0	6
4:45 PM	5	4	0	4	5:21 PM	7	2	1	3
4:46 PM	5	4	0	4	5:22 PM	5	2	0	2
4:47 PM	4	2	0	2	5:23 PM	6	2	0	2
4:48 PM	7	3	0	3	5:24 PM	4	2	0	2
4:49 PM	6	2	0	2	5:25 PM	5	4	1	5
4:50 PM	3	2	0	2	5:26 PM	1	0	1	1
4:51 PM	5	2	0	2	Total	1103	413	262	675
4:52 PM	6	3	0	3					
4:53 PM	3	2	0	2					
4:54 PM	0	0	0	0					
4:55 PM	11	2	12	14					
4:56 PM	7	4	0	4					
4:57 PM	7	3	0	3					
4:58 PM	3	2	0	2					
4:59 PM	4	2	0	2					
5:00 PM	5	3	0	3					
5:01 PM	4	2	0	2					

Table A.12 US 31 inside and around Melvern, KS on August 12, 2014. 1st iCone

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:43 AM	2	1	0	1	10:19 AM	2	0	0	0
9:44 AM	0	0	0	0	10:20 AM	0	0	0	0
9:45 AM	0	0	0	0	10:21 AM	4	0	1	1
9:46 AM	0	0	0	0	10:22 AM	0	0	0	0
9:47 AM	0	0	0	0	10:23 AM	1	0	1	1
9:48 AM	2	0	1	1	10:24 AM	3	1	0	1
9:49 AM	2	1	0	1	10:25 AM	0	0	0	0
9:50 AM	3	1	1	2	10:26 AM	0	0	0	0
9:51 AM	3	1	2	3	10:27 AM	1	0	0	0
9:52 AM	0	0	0	0	10:28 AM	0	0	0	0
9:53 AM	0	1	0	1	10:29 AM	0	0	0	0
9:54 AM	0	0	0	0	10:30 AM	2	2	0	2
9:55 AM	0	0	0	0	10:31 AM	2	0	1	1
9:56 AM	0	0	0	0	10:32 AM	4	2	0	2
9:57 AM	0	0	0	0	10:33 AM	1	0	0	0
9:58 AM	1	1	0	1	10:34 AM	2	1	0	1
9:59 AM	2	0	1	1	10:35 AM	0	0	1	1
10:00 AM	0	0	0	0	10:36 AM	6	1	0	1
10:01 AM	2	1	0	1	10:37 AM	1	0	2	2
10:02 AM	2	1	0	1	10:38 AM	4	0	0	0
10:03 AM	2	1	0	1	10:39 AM	0	0	0	0
10:04 AM	2	0	1	1	10:40 AM	0	0	0	0
10:05 AM	0	1	0	1	10:41 AM	0	0	0	0
10:06 AM	5	2	0	2	10:42 AM	2	0	1	1
10:07 AM	2	2	1	3	10:43 AM	0	0	0	0
10:08 AM	3	1	0	1	10:44 AM	0	0	0	0
10:09 AM	2	2	1	3	10:45 AM	0	1	0	1
10:10 AM	6	1	1	2	10:46 AM	4	1	1	2
10:11 AM	1	1	0	1	10:47 AM	2	0	0	0
10:12 AM	2	0	0	0	10:48 AM	0	0	0	0
10:13 AM	4	2	3	5	10:49 AM	0	1	0	1
10:14 AM	4	0	1	1	10:50 AM	4	0	2	2
10:15 AM	0	0	0	0	10:51 AM	2	0	2	2
10:16 AM	2	0	1	1	10:52 AM	2	0	0	0
10:17 AM	0	0	0	0	10:53 AM	0	0	0	0
10:18 AM	0	0	1	1	10:54 AM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:55 AM	0	0	0	0	11:31 AM	0	0	0	0
10:56 AM	0	1	0	1	11:32 AM	1	1	1	2
10:57 AM	4	1	0	1	11:33 AM	1	0	3	3
10:58 AM	6	4	0	4	11:34 AM	5	0	1	1
10:59 AM	4	1	2	3	11:35 AM	4	0	0	0
11:00 AM	1	0	0	0	11:36 AM	0	0	0	0
11:01 AM	0	1	1	2	11:37 AM	0	0	1	1
11:02 AM	3	0	0	0	11:38 AM	3	1	1	2
11:03 AM	0	0	0	0	11:39 AM	3	0	0	0
11:04 AM	0	0	0	0	11:40 AM	0	0	0	0
11:05 AM	0	1	0	1	11:41 AM	2	0	1	1
11:06 AM	2	0	0	0	11:42 AM	0	0	0	0
11:07 AM	0	0	0	0	11:43 AM	0	0	1	1
11:08 AM	0	0	0	0	11:44 AM	3	0	0	0
11:09 AM	2	0	1	1	11:45 AM	1	0	1	1
11:10 AM	0	0	0	0	11:46 AM	2	0	2	2
11:11 AM	0	0	0	0	11:47 AM	4	0	2	2
11:12 AM	0	1	1	2	11:48 AM	0	0	0	0
11:13 AM	3	1	0	1	11:49 AM	1	0	0	0
11:14 AM	3	0	0	0	11:50 AM	2	1	1	2
11:15 AM	0	0	0	0	11:51 AM	1	0	0	0
11:16 AM	0	2	0	2	11:52 AM	0	4	0	4
11:17 AM	4	0	1	1	11:53 AM	4	0	0	0
11:18 AM	2	0	2	2	11:54 AM	0	0	1	1
11:19 AM	9	0	3	3	11:55 AM	1	0	0	0
11:20 AM	0	0	0	0	11:56 AM	0	0	0	0
11:21 AM	2	0	1	1	11:57 AM	0	0	0	0
11:22 AM	2	1	1	2	2:02 PM	0	1	1	2
11:23 AM	2	0	0	0	2:03 PM	6	0	1	1
11:24 AM	0	0	0	0	2:04 PM	0	0	0	0
11:25 AM	0	0	0	0	2:05 PM	0	0	0	0
11:26 AM	0	0	0	0	2:06 PM	2	0	1	1
11:27 AM	0	0	0	0	2:07 PM	2	0	1	1
11:28 AM	2	1	0	1	2:08 PM	0	0	0	0
11:29 AM	3	1	1	2	2:09 PM	2	0	1	1
11:30 AM	1	0	0	0	2:10 PM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:11 PM	0	0	0	0	2:47 PM	0	0	0	0
2:12 PM	3	0	0	0	2:48 PM	0	0	0	0
2:13 PM	0	0	1	1	2:49 PM	2	0	0	0
2:14 PM	4	1	1	2	2:50 PM	3	1	1	2
2:15 PM	0	0	0	0	2:51 PM	0	0	0	0
2:16 PM	5	1	1	2	2:52 PM	1	1	0	1
2:17 PM	0	0	0	0	2:53 PM	0	0	0	0
2:18 PM	0	0	0	0	2:54 PM	0	0	0	0
2:19 PM	2	0	1	1	2:55 PM	0	0	0	0
2:20 PM	1	0	1	1	2:56 PM	0	0	0	0
2:21 PM	0	0	0	0	2:57 PM	0	0	0	0
2:22 PM	0	0	0	0	2:58 PM	0	0	0	0
2:23 PM	0	0	0	0	2:59 PM	5	0	2	2
2:24 PM	0	0	0	0	3:00 PM	4	1	0	1
2:25 PM	0	0	0	0	3:01 PM	1	0	2	2
2:26 PM	2	1	0	1	3:02 PM	2	0	1	1
2:27 PM	0	0	0	0	3:03 PM	1	1	0	1
2:28 PM	3	0	1	1	3:04 PM	1	0	0	0
2:29 PM	0	0	0	0	3:05 PM	0	0	0	0
2:30 PM	0	0	0	0	3:06 PM	0	0	0	0
2:31 PM	3	1	1	2	3:07 PM	0	0	0	0
2:32 PM	0	0	0	0	3:08 PM	0	0	0	0
2:33 PM	0	0	0	0	3:09 PM	3	0	1	1
2:34 PM	0	0	0	0	3:10 PM	1	0	0	0
2:35 PM	0	0	0	0	3:11 PM	1	1	0	1
2:36 PM	0	0	0	0	3:12 PM	3	0	3	3
2:37 PM	0	0	0	0	3:13 PM	16	0	2	2
2:38 PM	0	0	0	0	3:14 PM	5	0	9	9
2:39 PM	0	0	0	0	3:15 PM	0	0	0	0
2:40 PM	2	0	2	2	3:16 PM	0	0	0	0
2:41 PM	0	0	0	0	3:17 PM	0	0	0	0
2:42 PM	0	0	0	0	3:18 PM	0	0	0	0
2:43 PM	0	0	0	0	3:19 PM	3	0	3	3
2:44 PM	0	0	0	0	3:20 PM	1	0	0	0
2:45 PM	1	1	0	1	3:21 PM	0	0	0	0
2:46 PM	10	0	4	4	3:22 PM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
3:23 PM	2	0	1	1	3:58 PM	2	0	0	0
3:24 PM	0	0	0	0	3:59 PM	0	0	0	0
3:25 PM	1	0	3	3	4:00 PM	0	0	0	0
3:26 PM	4	0	1	1	4:01 PM	0	0	0	0
3:27 PM	0	0	0	0	4:02 PM	0	0	0	0
3:28 PM	2	0	0	0	4:03 PM	3	2	2	4
3:29 PM	2	1	1	2	4:04 PM	2	0	0	0
3:30 PM	0	0	0	0	4:05 PM	0	0	0	0
3:31 PM	1	1	0	1	4:06 PM	0	0	0	0
3:32 PM	0	0	0	0	4:07 PM	0	1	0	1
3:33 PM	0	0	0	0	4:08 PM	5	2	4	6
3:34 PM	0	0	0	0	4:09 PM	9	1	0	1
3:35 PM	0	0	0	0	4:10 PM	0	0	0	0
3:36 PM	0	0	0	0	4:11 PM	0	0	0	0
3:37 PM	0	0	0	0	4:12 PM	0	0	0	0
3:38 PM	5	1	1	2	4:13 PM	2	1	0	1
3:39 PM	4	0	0	0	4:14 PM	0	0	0	0
3:40 PM	4	0	14	14	4:15 PM	0	0	0	0
3:41 PM	11	0	0	0	4:16 PM	0	0	0	0
3:42 PM	1	0	0	0	4:17 PM	0	0	0	0
3:43 PM	0	0	0	0	4:18 PM	0	0	0	0
3:44 PM	0	0	0	0	4:19 PM	0	0	0	0
3:45 PM	0	0	0	0	4:20 PM	0	0	0	0
3:46 PM	0	0	0	0	4:21 PM	4	0	1	1
3:47 PM	0	0	0	0	4:22 PM	11	1	7	8
3:48 PM	0	0	0	0	4:23 PM	3	1	0	1
3:49 PM	0	0	0	0	4:24 PM	0	0	0	0
3:50 PM	0	1	0	1	4:25 PM	5	1	1	2
3:51 PM	0	0	2	2	4:26 PM	0	0	0	0
3:52 PM	3	0	9	9	4:27 PM	0	0	0	0
3:53 PM	3	0	9	9	4:28 PM	2	0	1	1
3:54 PM	16	0	5	5	4:29 PM	0	0	0	0
3:55 PM	13	0	0	0	4:30 PM	0	0	0	0
3:56 PM	8	0	1	1	Total	425	79	162	241
3:57 PM	0	0	0	0					

Table A.13 US 31 inside and around Melvern, KS on August 12, 2014. 2nd iCone

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
8:51 AM	0	0	0	0	9:27 AM	0	0	0	0
8:52 AM	0	0	0	0	9:28 AM	0	0	0	0
8:53 AM	0	0	0	0	9:29 AM	0	0	0	0
8:54 AM	0	0	0	0	9:30 AM	0	0	0	0
8:55 AM	0	0	0	0	9:31 AM	0	0	0	0
8:56 AM	0	0	0	0	9:32 AM	0	0	0	0
8:57 AM	0	0	0	0	9:33 AM	0	0	0	0
8:58 AM	0	0	0	0	9:34 AM	0	0	0	0
8:59 AM	0	0	0	0	9:35 AM	0	0	0	0
9:00 AM	1	0	1	1	9:36 AM	0	0	0	0
9:01 AM	0	0	0	0	9:37 AM	1	0	1	1
9:02 AM	0	0	0	0	9:38 AM	1	0	0	0
9:03 AM	0	0	0	0	9:39 AM	0	0	0	0
9:04 AM	0	0	0	0	9:40 AM	0	0	0	0
9:05 AM	0	0	0	0	9:41 AM	0	0	0	0
9:06 AM	0	0	0	0	9:42 AM	0	0	0	0
9:07 AM	0	0	0	0	9:43 AM	0	0	0	0
9:08 AM	0	0	0	0	9:44 AM	0	0	0	0
9:09 AM	0	0	0	0	9:45 AM	0	0	0	0
9:10 AM	0	0	0	0	9:46 AM	5	1	0	1
9:11 AM	0	0	0	0	9:47 AM	0	0	0	0
9:12 AM	0	0	0	0	9:48 AM	0	0	0	0
9:13 AM	0	0	0	0	9:49 AM	0	0	0	0
9:14 AM	4	0	2	2	9:50 AM	0	0	0	0
9:15 AM	0	0	0	0	9:51 AM	0	0	0	0
9:16 AM	0	0	0	0	9:52 AM	1	1	0	1
9:17 AM	2	1	0	1	9:53 AM	0	0	0	0
9:18 AM	3	1	0	1	9:54 AM	0	0	0	0
9:19 AM	0	0	0	0	9:55 AM	2	1	0	1
9:20 AM	0	0	0	0	9:56 AM	0	0	0	0
9:21 AM	1	2	0	2	9:57 AM	0	0	0	0
9:22 AM	0	0	0	0	9:58 AM	0	0	0	0
9:23 AM	0	0	0	0	9:59 AM	0	0	0	0
9:24 AM	0	0	0	0	10:00 AM	0	0	0	0
9:25 AM	0	0	0	0	10:01 AM	1	1	0	1
9:26 AM	0	0	0	0	10:02 AM	2	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:03 AM	0	0	0	0	10:39 AM	0	0	0	0
10:04 AM	0	0	1	1	10:40 AM	5	0	3	3
10:05 AM	5	0	1	1	10:41 AM	0	0	0	0
10:06 AM	0	0	0	0	10:42 AM	0	0	0	0
10:07 AM	0	1	0	1	10:43 AM	0	0	0	0
10:08 AM	0	1	0	1	10:44 AM	0	0	0	0
10:09 AM	0	0	0	0	10:45 AM	0	0	0	0
10:10 AM	0	0	0	0	10:46 AM	0	0	0	0
10:11 AM	0	0	0	0	10:47 AM	4	0	1	1
10:12 AM	0	0	0	0	10:48 AM	0	0	0	0
10:13 AM	0	0	0	0	10:49 AM	2	1	0	1
10:14 AM	0	0	0	0	10:50 AM	0	0	0	0
10:15 AM	0	0	0	0	10:51 AM	0	0	0	0
10:16 AM	4	1	1	2	10:52 AM	3	0	1	1
10:17 AM	1	0	0	0	10:53 AM	0	0	0	0
10:18 AM	0	0	0	0	10:54 AM	0	0	0	0
10:19 AM	0	0	0	0	10:55 AM	0	0	0	0
10:20 AM	0	0	0	0	10:56 AM	0	0	0	0
10:21 AM	4	1	0	1	10:57 AM	0	0	0	0
10:22 AM	0	0	0	0	10:58 AM	2	1	0	1
10:23 AM	0	0	0	0	10:59 AM	0	0	0	0
10:24 AM	0	0	0	0	11:00 AM	0	0	0	0
10:25 AM	4	1	0	1	11:01 AM	0	0	0	0
10:26 AM	0	0	0	0	11:02 AM	0	0	0	0
10:27 AM	0	0	0	0	11:03 AM	1	1	0	1
10:28 AM	0	0	0	0	11:04 AM	5	0	2	2
10:29 AM	3	0	1	1	11:05 AM	0	0	0	0
10:30 AM	0	0	0	0	11:06 AM	0	0	0	0
10:31 AM	0	0	0	0	11:07 AM	0	0	0	0
10:32 AM	0	0	0	0	11:08 AM	0	0	0	0
10:33 AM	0	0	0	0	11:09 AM	0	0	0	0
10:34 AM	0	0	0	0	11:10 AM	0	0	0	0
10:35 AM	0	0	0	0	11:11 AM	2	1	0	1
10:36 AM	0	1	0	1	11:12 AM	1	1	0	1
10:37 AM	2	0	0	0	11:13 AM	3	1	0	1
10:38 AM	0	0	0	0	11:14 AM	8	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:15 AM	1	0	4	4	11:39 AM	2	0	1	1
11:16 AM	1	0	0	0	11:40 AM	0	0	0	0
11:17 AM	0	1	0	1	11:41 AM	1	1	0	1
11:18 AM	0	0	0	0	11:42 AM	0	0	0	0
11:19 AM	3	0	0	0	11:43 AM	0	0	0	0
11:20 AM	0	1	0	1	11:44 AM	0	0	0	0
11:21 AM	0	0	0	0	11:45 AM	0	0	0	0
11:22 AM	0	0	0	0	11:46 AM	0	0	0	0
11:23 AM	2	0	1	1	11:47 AM	0	0	0	0
11:24 AM	0	0	0	0	11:48 AM	0	0	0	0
11:25 AM	0	0	0	0	11:49 AM	0	0	0	0
11:26 AM	2	2	0	2	11:50 AM	0	0	0	0
11:27 AM	0	0	0	0	11:51 AM	0	0	0	0
11:28 AM	0	0	0	0	11:52 AM	0	0	0	0
11:29 AM	0	0	0	0	11:53 AM	0	0	0	0
11:30 AM	0	0	0	0	11:54 AM	0	0	0	0
11:31 AM	0	0	0	0	11:55 AM	0	0	0	0
11:32 AM	0	0	0	0	11:56 AM	2	1	0	1
11:33 AM	0	0	0	0	11:57 AM	0	0	0	0
11:34 AM	0	0	0	0	11:58 AM	1	1	0	1
11:35 AM	0	0	0	0	11:59 AM	0	0	0	0
11:36 AM	0	0	0	0	12:00 PM	1	0	1	1
11:37 AM	0	0	0	0	Grand Total	100	27	23	50
11:38 AM	1	0	1	1					

Table A.14 US 31 inside and around Melvern, KS on August 13, 2014.

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
7:49 AM	1	0	0	0	8:25 AM	4	0	1	1
7:50 AM	6	1	2	3	8:26 AM	0	0	1	1
7:51 AM	6	2	1	3	8:27 AM	3	0	1	1
7:52 AM	7	1	1	2	8:28 AM	2	1	0	1
7:53 AM	3	3	1	4	8:29 AM	0	0	0	0
7:54 AM	0	0	0	0	8:30 AM	2	1	0	1
7:55 AM	3	0	1	1	8:31 AM	6	1	0	1
7:56 AM	0	0	0	0	8:32 AM	4	2	0	2
7:57 AM	5	1	0	1	8:33 AM	1	0	0	0
7:58 AM	6	0	1	1	8:34 AM	0	0	0	0
7:59 AM	0	0	0	0	8:35 AM	1	0	0	0
8:00 AM	0	0	0	0	8:36 AM	0	0	0	0
8:01 AM	6	1	1	2	8:37 AM	0	0	0	0
8:02 AM	0	0	0	0	8:38 AM	6	0	2	2
8:03 AM	0	0	0	0	8:39 AM	1	2	0	2
8:04 AM	3	0	1	1	8:40 AM	0	0	0	0
8:05 AM	10	1	8	9	8:41 AM	2	0	0	0
8:06 AM	3	0	0	0	8:42 AM	0	1	0	1
8:07 AM	0	0	1	1	8:43 AM	0	0	0	0
8:08 AM	0	0	0	0	8:44 AM	0	0	0	0
8:09 AM	3	1	0	1	8:45 AM	2	0	0	0
8:10 AM	1	0	0	0	8:46 AM	3	1	0	1
8:11 AM	3	0	1	1	8:47 AM	2	1	1	2
8:12 AM	1	0	0	0	8:48 AM	0	0	1	1
8:13 AM	3	1	0	1	8:49 AM	6	0	4	4
8:14 AM	2	0	0	0	8:50 AM	0	0	0	0
8:15 AM	0	0	0	0	8:51 AM	2	1	0	1
8:16 AM	3	0	0	0	8:52 AM	2	1	0	1
8:17 AM	7	0	3	3	8:53 AM	2	1	0	1
8:18 AM	0	0	0	0	8:54 AM	4	0	1	1
8:19 AM	0	0	0	0	8:55 AM	0	1	0	1
8:20 AM	0	0	0	0	8:56 AM	1	0	0	0
8:21 AM	0	0	0	0	8:57 AM	1	0	0	0
8:22 AM	2	2	0	2	8:58 AM	12	2	0	2
8:23 AM	0	0	0	0	8:59 AM	0	2	1	3
8:24 AM	4	1	0	1	9:00 AM	7	0	2	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:01 AM	1	1	1	2	9:37 AM	7	2	1	3
9:02 AM	0	0	0	0	9:38 AM	7	1	1	2
9:03 AM	2	0	0	0	9:39 AM	1	0	0	0
9:04 AM	1	0	0	0	9:40 AM	0	0	0	0
9:05 AM	3	1	0	1	9:41 AM	0	0	0	0
9:06 AM	2	0	0	0	9:42 AM	2	0	0	0
9:07 AM	0	0	0	0	9:43 AM	2	0	1	1
9:08 AM	0	0	0	0	9:44 AM	0	0	0	0
9:09 AM	4	1	0	1	9:45 AM	3	1	0	1
9:10 AM	0	0	0	0	9:46 AM	4	0	1	1
9:11 AM	5	1	0	1	9:47 AM	10	2	0	2
9:12 AM	8	0	4	4	9:48 AM	0	1	0	1
9:13 AM	3	0	1	1	9:49 AM	1	1	0	1
9:14 AM	4	0	0	0	9:50 AM	0	0	0	0
9:15 AM	0	1	0	1	9:51 AM	0	0	0	0
9:16 AM	2	1	0	1	9:52 AM	0	0	0	0
9:17 AM	4	0	0	0	9:53 AM	2	1	0	1
9:18 AM	2	0	1	1	9:54 AM	0	0	0	0
9:19 AM	0	0	0	0	9:55 AM	0	0	0	0
9:20 AM	2	0	0	0	9:56 AM	7	0	2	2
9:21 AM	0	1	0	1	9:57 AM	4	0	1	1
9:22 AM	1	0	0	0	9:58 AM	0	0	0	0
9:23 AM	1	0	0	0	9:59 AM	0	0	0	0
9:24 AM	2	0	0	0	10:00 AM	0	0	0	0
9:25 AM	2	0	0	0	10:01 AM	4	1	0	1
9:26 AM	0	0	1	1	10:02 AM	2	1	0	1
9:27 AM	0	0	0	0	10:03 AM	2	0	0	0
9:28 AM	0	0	0	0	10:04 AM	0	0	0	0
9:29 AM	3	0	1	1	10:05 AM	2	1	0	1
9:30 AM	3	1	0	1	10:06 AM	3	0	0	0
9:31 AM	2	1	0	1	10:07 AM	0	0	1	1
9:32 AM	1	0	0	0	10:08 AM	1	0	1	1
9:33 AM	1	1	0	1	10:09 AM	2	0	0	0
9:34 AM	10	0	4	4	10:10 AM	1	0	0	0
9:35 AM	4	2	0	2	10:11 AM	0	0	0	0
9:36 AM	8	1	0	1	10:12 AM	1	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:13 AM	1	0	0	0	10:49 AM	0	1	1	2
10:14 AM	0	1	0	1	10:50 AM	0	0	0	0
10:15 AM	0	0	0	0	10:51 AM	1	1	0	1
10:16 AM	3	0	0	0	10:52 AM	0	0	0	0
10:17 AM	1	1	1	2	10:53 AM	0	1	2	3
10:18 AM	2	0	0	0	10:54 AM	2	0	0	0
10:19 AM	3	1	0	1	10:55 AM	0	1	0	1
10:20 AM	0	0	0	0	10:56 AM	1	1	0	1
10:21 AM	3	0	0	0	10:57 AM	0	0	0	0
10:22 AM	0	1	0	1	10:58 AM	3	0	0	0
10:23 AM	0	0	1	1	10:59 AM	2	0	0	0
10:24 AM	5	0	0	0	11:00 AM	0	0	0	0
10:25 AM	2	1	0	1	11:01 AM	1	0	0	0
10:26 AM	1	1	1	2	11:02 AM	2	0	0	0
10:27 AM	6	1	0	1	11:03 AM	0	0	1	1
10:28 AM	3	1	0	1	11:04 AM	0	1	1	2
10:29 AM	2	0	2	2	11:05 AM	0	0	0	0
10:30 AM	2	0	0	0	11:06 AM	0	0	0	0
10:31 AM	2	0	0	0	11:07 AM	0	0	0	0
10:32 AM	2	0	0	0	11:08 AM	0	0	0	0
10:33 AM	1	2	0	2	11:09 AM	1	0	1	1
10:34 AM	0	1	0	1	11:10 AM	1	1	1	2
10:35 AM	0	0	0	0	11:11 AM	1	1	0	1
10:36 AM	0	0	0	0	11:12 AM	1	0	2	2
10:37 AM	3	0	0	0	11:13 AM	0	0	0	0
10:38 AM	2	0	0	0	11:14 AM	0	0	0	0
10:39 AM	0	0	1	1	11:15 AM	0	0	0	0
10:40 AM	0	0	0	0	11:16 AM	1	3	0	3
10:41 AM	0	1	2	3	11:17 AM	2	1	2	3
10:42 AM	0	2	1	3	11:18 AM	1	0	0	0
10:43 AM	3	2	1	3	11:19 AM	2	0	0	0
10:44 AM	0	0	0	0	11:20 AM	1	1	0	1
10:45 AM	0	1	0	1	11:21 AM	0	0	0	0
10:46 AM	6	0	0	0	11:22 AM	0	1	1	2
10:47 AM	3	0	0	0	11:23 AM	1	1	0	1
10:48 AM	2	1	0	1	11:24 AM	5	2	1	3

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:25 AM	0	1	0	1	12:01 PM	0	0	1	1
11:26 AM	0	0	0	0	12:02 PM	0	0	0	0
11:27 AM	0	1	0	1	12:03 PM	4	0	1	1
11:28 AM	0	1	1	2	12:04 PM	4	1	0	1
11:29 AM	2	0	0	0	12:05 PM	3	1	0	1
11:30 AM	1	0	0	0	12:06 PM	0	0	0	0
11:31 AM	0	0	0	0	12:07 PM	0	0	0	0
11:32 AM	1	0	0	0	12:08 PM	0	0	3	3
11:33 AM	1	0	0	0	12:09 PM	3	1	1	2
11:34 AM	2	1	0	1	12:10 PM	3	1	0	1
11:35 AM	0	1	0	1	12:11 PM	6	1	0	1
11:36 AM	1	0	0	0	12:12 PM	0	0	0	0
11:37 AM	0	2	1	3	12:13 PM	0	0	0	0
11:38 AM	2	1	0	1	12:14 PM	2	1	1	2
11:39 AM	0	0	1	1	12:15 PM	0	0	1	1
11:40 AM	0	0	1	1	12:16 PM	1	0	0	0
11:41 AM	0	0	3	3	12:17 PM	3	0	0	0
11:42 AM	0	0	0	0	12:18 PM	0	0	0	0
11:43 AM	1	1	0	1	12:19 PM	3	1	1	2
11:44 AM	0	0	1	1	12:20 PM	0	1	1	2
11:45 AM	2	0	0	0	12:21 PM	8	2	1	3
11:46 AM	0	0	0	0	12:22 PM	6	2	0	2
11:47 AM	4	0	0	0	12:23 PM	0	2	0	2
11:48 AM	0	0	1	1	12:24 PM	3	0	1	1
11:49 AM	4	0	0	0	12:25 PM	0	1	0	1
11:50 AM	1	0	0	0	12:26 PM	0	0	0	0
11:51 AM	6	0	3	3	12:27 PM	3	0	0	0
11:52 AM	0	0	0	0	12:28 PM	5	1	0	1
11:53 AM	0	1	0	1	12:29 PM	1	0	0	0
11:54 AM	5	0	0	0	12:30 PM	0	0	1	1
11:55 AM	0	0	0	0	12:31 PM	3	0	0	0
11:56 AM	2	1	0	1	12:32 PM	6	1	1	2
11:57 AM	1	0	0	0	12:33 PM	4	0	3	3
11:58 AM	0	1	3	4	12:34 PM	4	0	0	0
11:59 AM	0	0	0	0	12:35 PM	1	1	0	1
12:00 PM	2	0	0	0	12:36 PM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:37 PM	5	0	0	0	1:13 PM	1	0	0	0
12:38 PM	0	1	0	1	1:14 PM	3	0	0	0
12:39 PM	0	0	0	0	1:15 PM	4	0	0	0
12:40 PM	4	0	0	0	1:16 PM	7	0	0	0
12:41 PM	0	0	0	0	1:17 PM	3	0	0	0
12:42 PM	1	0	0	0	1:18 PM	2	0	0	0
12:43 PM	2	1	0	1	1:19 PM	1	0	0	0
12:44 PM	2	1	4	5	1:20 PM	4	0	0	0
12:45 PM	1	1	0	1	1:21 PM	0	0	0	0
12:46 PM	7	0	0	0	1:22 PM	9	0	0	0
12:47 PM	0	0	0	0	1:37 PM	3	0	0	0
12:48 PM	3	0	0	0	1:38 PM	2	1	0	1
12:49 PM	0	0	0	0	1:39 PM	0	1	0	1
12:50 PM	1	0	0	0	1:40 PM	2	0	0	0
12:51 PM	0	1	0	1	1:41 PM	0	0	2	2
12:52 PM	2	0	1	1	1:42 PM	3	1	0	1
12:53 PM	0	0	1	1	1:43 PM	3	1	0	1
12:54 PM	0	0	0	0	1:44 PM	0	1	0	1
12:55 PM	0	0	4	4	1:45 PM	5	1	0	1
12:56 PM	0	2	1	3	1:46 PM	0	0	0	0
12:57 PM	3	1	0	1	1:47 PM	1	1	0	1
12:58 PM	5	2	0	2	1:48 PM	2	0	0	0
12:59 PM	6	1	0	1	1:49 PM	0	1	0	1
1:00 PM	0	2	0	2	1:50 PM	0	0	0	0
1:01 PM	0	2	0	2	1:51 PM	2	0	0	0
1:02 PM	1	0	2	2	1:52 PM	0	0	0	0
1:03 PM	3	0	0	0	1:53 PM	0	0	0	0
1:04 PM	0	0	1	1	1:54 PM	2	0	0	0
1:05 PM	2	1	0	1	1:55 PM	2	1	1	2
1:06 PM	2	1	0	1	1:56 PM	2	0	0	0
1:07 PM	4	0	3	3	1:57 PM	4	1	1	2
1:08 PM	3	1	3	4	1:58 PM	0	0	0	0
1:09 PM	0	0	1	1	1:59 PM	0	0	0	0
1:10 PM	6	0	0	0	2:00 PM	4	2	0	2
1:11 PM	8	0	0	0	2:01 PM	0	0	0	0
1:12 PM	5	0	0	0	2:02 PM	0	2	0	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:03 PM	4	0	3	3	2:39 PM	0	0	0	0
2:04 PM	3	0	0	0	2:40 PM	0	0	0	0
2:05 PM	0	0	0	0	2:41 PM	0	0	0	0
2:06 PM	0	0	0	0	2:42 PM	0	0	0	0
2:07 PM	0	0	0	0	2:43 PM	0	0	0	0
2:08 PM	0	0	0	0	2:44 PM	0	0	0	0
2:09 PM	0	0	0	0	2:45 PM	0	0	0	0
2:10 PM	1	0	0	0	2:46 PM	4	0	2	2
2:11 PM	0	1	0	1	2:47 PM	0	0	0	0
2:12 PM	2	0	0	0	2:48 PM	0	0	0	0
2:13 PM	0	0	0	0	2:49 PM	2	0	1	1
2:14 PM	0	0	0	0	2:50 PM	4	0	0	0
2:15 PM	4	1	0	1	2:51 PM	0	1	0	1
2:16 PM	3	2	1	3	2:52 PM	1	0	0	0
2:17 PM	0	0	0	0	2:53 PM	1	0	3	3
2:18 PM	0	0	0	0	2:54 PM	1	0	0	0
2:19 PM	0	0	0	0	2:55 PM	9	0	0	0
2:20 PM	0	0	0	0	2:56 PM	0	0	0	0
2:21 PM	0	0	0	0	2:57 PM	0	0	0	0
2:22 PM	0	0	0	0	2:58 PM	2	0	1	1
2:23 PM	2	2	0	2	2:59 PM	3	1	0	1
2:24 PM	2	0	0	0	3:00 PM	0	0	0	0
2:25 PM	1	0	2	2	3:01 PM	0	0	1	1
2:26 PM	5	1	0	1	3:02 PM	2	0	0	0
2:27 PM	0	0	0	0	3:03 PM	0	0	0	0
2:28 PM	3	2	1	3	3:04 PM	0	1	0	1
2:29 PM	3	0	0	0	3:05 PM	0	0	0	0
2:30 PM	0	0	0	0	3:06 PM	1	0	0	0
2:31 PM	0	0	0	0	3:07 PM	0	0	0	0
2:32 PM	0	0	0	0	3:08 PM	0	0	0	0
2:33 PM	0	0	0	0	3:09 PM	0	0	0	0
2:34 PM	0	0	0	0	3:10 PM	0	0	0	0
2:35 PM	0	0	0	0	3:11 PM	2	1	0	1
2:36 PM	6	0	4	4	3:12 PM	3	1	1	2
2:37 PM	0	0	0	0	3:13 PM	0	0	0	0
2:38 PM	0	0	0	0	3:14 PM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
3:15 PM	4	1	0	1	3:51 PM	0	0	0	0
3:16 PM	0	0	0	0	3:52 PM	2	0	0	0
3:17 PM	0	0	0	0	3:53 PM	0	1	0	1
3:18 PM	0	1	0	1	3:54 PM	0	0	0	0
3:19 PM	1	0	0	0	3:55 PM	2	0	1	1
3:20 PM	0	0	0	0	3:56 PM	0	0	0	0
3:21 PM	0	0	0	0	3:57 PM	2	0	1	1
3:22 PM	3	0	3	3	3:58 PM	0	1	1	2
3:23 PM	0	0	0	0	3:59 PM	0	0	0	0
3:24 PM	3	2	0	2	4:00 PM	2	0	0	0
3:25 PM	1	1	0	1	4:01 PM	3	1	0	1
3:26 PM	0	0	1	1	4:02 PM	0	0	0	0
3:27 PM	6	1	0	1	4:03 PM	0	0	0	0
3:28 PM	1	0	0	0	4:04 PM	2	3	0	3
3:29 PM	0	0	0	0	4:05 PM	0	1	0	1
3:30 PM	0	0	0	0	4:06 PM	0	0	1	1
3:31 PM	0	0	0	0	4:07 PM	6	0	0	0
3:32 PM	2	0	2	2	4:08 PM	2	0	0	0
3:33 PM	0	0	0	0	4:09 PM	1	0	4	4
3:34 PM	2	1	0	1	4:10 PM	1	1	0	1
3:35 PM	0	0	0	0	4:11 PM	0	0	0	0
3:36 PM	0	0	0	0	4:12 PM	7	2	0	2
3:37 PM	0	0	0	0	4:13 PM	2	0	0	0
3:38 PM	1	0	1	1	4:14 PM	0	0	0	0
3:39 PM	0	0	0	0	4:15 PM	4	1	0	1
3:40 PM	0	0	2	2	4:16 PM	0	0	0	0
3:41 PM	3	0	0	0	4:17 PM	0	0	0	0
3:42 PM	0	0	0	0	4:18 PM	2	0	6	6
3:43 PM	0	0	0	0	4:19 PM	0	0	1	1
3:44 PM	1	1	0	1	4:20 PM	1	2	0	2
3:45 PM	2	0	0	0	4:21 PM	5	1	0	1
3:46 PM	0	0	0	0	4:22 PM	2	0	0	0
3:47 PM	0	0	1	1	4:23 PM	6	1	0	1
3:48 PM	0	0	0	0	4:24 PM	3	0	0	0
3:49 PM	3	0	0	0	4:25 PM	0	1	0	1
3:50 PM	0	1	0	1	4:26 PM	2	2	0	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
4:27 PM	0	0	0	0	4:53 PM	0	1	3	4
4:28 PM	2	1	0	1	4:54 PM	4	0	0	0
4:29 PM	4	0	0	0	4:55 PM	1	0	0	0
4:30 PM	1	1	4	5	4:56 PM	5	0	1	1
4:31 PM	7	0	1	1	4:57 PM	0	0	0	0
4:32 PM	0	0	0	0	4:58 PM	0	2	1	3
4:33 PM	6	0	0	0	4:59 PM	0	0	1	1
4:34 PM	7	0	0	0	5:00 PM	2	2	2	4
4:35 PM	0	0	1	1	5:01 PM	3	0	0	0
4:36 PM	1	1	0	1	5:02 PM	10	0	0	0
4:37 PM	0	0	0	0	5:03 PM	3	0	1	1
4:38 PM	2	0	1	1	5:04 PM	9	1	2	3
4:39 PM	2	0	0	0	5:05 PM	0	0	0	0
4:40 PM	0	1	0	1	5:06 PM	0	0	0	0
4:41 PM	1	0	0	0	5:07 PM	3	0	2	2
4:42 PM	1	0	0	0	5:08 PM	5	1	0	1
4:43 PM	2	0	0	0	5:09 PM	3	1	0	1
4:44 PM	0	0	0	0	5:10 PM	0	2	0	2
4:45 PM	0	0	1	1	5:11 PM	5	0	0	0
4:46 PM	0	0	2	2	5:12 PM	6	1	0	1
4:47 PM	0	0	0	0	5:13 PM	3	1	0	1
4:48 PM	1	1	1	2	5:14 PM	3	1	5	6
4:49 PM	10	0	0	0	5:15 PM	2	0	0	0
4:50 PM	0	0	0	0	Total	943	215	214	429
4:51 PM	0	1	1	2					
4:52 PM	4	0	0	0					

Table A.15 US 24 inside and around Beloit, KS on August 19, 2014.

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:24 AM	3	2	0	2	10:00 AM	2	1	0	1
9:25 AM	1	1	0	1	10:01 AM	6	2	0	2
9:26 AM	0	1	1	2	10:02 AM	3	1	1	2
9:27 AM	0	0	0	0	10:03 AM	3	0	0	0
9:28 AM	0	0	1	1	10:04 AM	0	0	0	0
9:29 AM	0	0	1	1	10:05 AM	0	0	0	0
9:30 AM	2	0	0	0	10:06 AM	0	0	0	0
9:31 AM	1	0	1	1	10:07 AM	3	1	0	1
9:32 AM	4	3	1	4	10:08 AM	1	1	0	1
9:33 AM	6	1	1	2	10:09 AM	6	0	3	3
9:34 AM	2	0	6	6	10:10 AM	1	1	2	3
9:35 AM	6	2	0	2	10:11 AM	4	2	0	2
9:36 AM	3	1	1	2	10:12 AM	0	0	0	0
9:37 AM	6	1	0	1	10:13 AM	4	2	1	3
9:38 AM	1	3	1	4	10:14 AM	3	0	0	0
9:39 AM	2	2	1	3	10:15 AM	2	2	1	3
9:40 AM	5	3	0	3	10:16 AM	3	0	0	0
9:41 AM	1	0	1	1	10:17 AM	5	3	0	3
9:42 AM	0	0	0	0	10:18 AM	1	3	0	3
9:43 AM	0	0	0	0	10:19 AM	1	1	0	1
9:44 AM	3	2	3	5	10:20 AM	0	1	0	1
9:45 AM	5	1	3	4	10:21 AM	0	0	0	0
9:46 AM	1	0	1	1	10:22 AM	0	2	3	5
9:47 AM	4	0	0	0	10:23 AM	3	1	6	7
9:48 AM	2	1	1	2	10:24 AM	2	1	0	1
9:49 AM	0	1	0	1	10:25 AM	0	0	0	0
9:50 AM	1	2	0	2	10:26 AM	0	0	1	1
9:51 AM	6	2	1	3	10:27 AM	3	1	0	1
9:52 AM	7	2	2	4	10:28 AM	5	1	0	1
9:53 AM	0	0	0	0	10:29 AM	0	1	0	1
9:54 AM	0	0	0	0	10:30 AM	0	0	0	0
9:55 AM	2	2	0	2	10:31 AM	1	0	1	1
9:56 AM	0	0	1	1	10:32 AM	3	0	0	0
9:57 AM	4	0	2	2	10:33 AM	3	2	1	3
9:58 AM	5	0	3	3	10:34 AM	3	3	0	3
9:59 AM	3	3	1	4	10:35 AM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:36 AM	6	2	6	8	11:12 AM	6	4	0	4
10:37 AM	1	0	1	1	11:13 AM	9	1	8	9
10:38 AM	2	2	0	2	11:14 AM	0	0	0	0
10:39 AM	3	1	0	1	11:15 AM	5	2	0	2
10:40 AM	4	2	0	2	11:16 AM	1	0	0	0
10:41 AM	2	3	1	4	11:17 AM	4	3	0	3
10:42 AM	0	0	1	1	11:18 AM	6	4	0	4
10:43 AM	0	0	0	0	11:19 AM	1	3	1	4
10:44 AM	4	1	1	2	11:20 AM	0	1	1	2
10:45 AM	2	1	0	1	11:21 AM	0	1	0	1
10:46 AM	1	1	0	1	11:22 AM	0	0	1	1
10:47 AM	2	1	0	1	11:23 AM	0	0	0	0
10:48 AM	5	3	0	3	11:24 AM	1	0	0	0
10:49 AM	6	2	8	10	11:25 AM	1	2	2	4
10:50 AM	2	0	0	0	11:26 AM	4	2	2	4
10:51 AM	0	0	0	0	11:27 AM	2	0	1	1
10:52 AM	0	0	0	0	11:28 AM	1	1	0	1
10:53 AM	1	0	0	0	11:29 AM	1	0	1	1
10:54 AM	1	1	2	3	11:30 AM	2	3	0	3
10:55 AM	0	0	0	0	11:31 AM	4	1	0	1
10:56 AM	0	0	1	1	11:32 AM	2	2	0	2
10:57 AM	3	0	1	1	11:33 AM	1	0	2	2
10:58 AM	2	1	1	2	11:34 AM	0	0	0	0
10:59 AM	2	1	0	1	11:35 AM	4	2	0	2
11:00 AM	0	0	0	0	11:36 AM	1	0	0	0
11:01 AM	9	1	6	7	11:37 AM	10	2	0	2
11:02 AM	12	6	0	6	11:38 AM	5	2	3	5
11:03 AM	4	5	0	5	11:39 AM	3	1	5	6
11:04 AM	1	2	0	2	11:40 AM	2	1	0	1
11:05 AM	0	0	2	2	11:41 AM	5	3	0	3
11:06 AM	2	0	4	4	11:42 AM	6	3	2	5
11:07 AM	1	0	0	0	11:43 AM	3	2	1	3
11:08 AM	3	1	0	1	11:44 AM	2	1	0	1
11:09 AM	2	1	0	1	11:45 AM	0	1	0	1
11:10 AM	1	1	0	1	11:46 AM	4	0	1	1
11:11 AM	1	3	0	3	11:47 AM	0	4	0	4

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:48 AM	0	1	0	1	12:24 PM	3	0	0	0
11:49 AM	0	1	0	1	12:25 PM	1	2	0	2
11:50 AM	1	3	0	3	12:26 PM	2	0	1	1
11:51 AM	1	1	1	2	12:27 PM	4	1	2	3
11:52 AM	6	1	2	3	12:28 PM	6	3	0	3
11:53 AM	2	3	2	5	12:29 PM	1	2	5	7
11:54 AM	1	2	1	3	12:30 PM	1	1	0	1
11:55 AM	2	0	1	1	12:31 PM	3	0	0	0
11:56 AM	6	1	3	4	12:32 PM	5	3	0	3
11:57 AM	1	1	1	2	12:33 PM	1	1	0	1
11:58 AM	1	1	0	1	12:34 PM	2	0	1	1
11:59 AM	0	0	1	1	12:35 PM	2	1	0	1
12:00 PM	1	0	1	1	12:36 PM	1	0	1	1
12:01 PM	5	0	1	1	12:37 PM	0	0	2	2
12:02 PM	3	3	1	4	12:38 PM	7	1	1	2
12:03 PM	0	2	1	3	12:39 PM	2	4	0	4
12:04 PM	7	1	0	1	12:40 PM	7	1	1	2
12:05 PM	3	1	3	4	12:41 PM	2	2	7	9
12:06 PM	0	2	1	3	12:42 PM	3	1	2	3
12:07 PM	3	0	2	2	12:43 PM	0	0	1	1
12:08 PM	4	4	0	4	12:44 PM	3	2	0	2
12:09 PM	3	2	1	3	12:45 PM	0	1	0	1
12:10 PM	0	1	1	2	12:46 PM	7	4	0	4
12:11 PM	2	0	0	0	12:47 PM	4	2	1	3
12:12 PM	1	2	0	2	12:48 PM	2	1	1	2
12:13 PM	6	1	0	1	12:49 PM	0	2	0	2
12:14 PM	4	2	0	2	12:50 PM	3	1	0	1
12:15 PM	2	1	3	4	12:51 PM	5	4	0	4
12:16 PM	3	1	3	4	12:52 PM	0	3	0	3
12:17 PM	2	2	2	4	12:53 PM	0	0	9	9
12:18 PM	2	1	1	2	12:54 PM	2	2	0	2
12:19 PM	2	1	0	1	12:55 PM	0	0	1	1
12:20 PM	0	1	0	1	12:56 PM	0	0	0	0
12:21 PM	0	0	0	0	12:57 PM	7	4	0	4
12:22 PM	0	0	0	0	12:58 PM	3	1	0	1
12:23 PM	0	2	1	3	12:59 PM	0	1	0	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
1:00 PM	0	0	0	0	1:36 PM	3	1	1	2
1:01 PM	4	0	2	2	1:37 PM	1	1	1	2
1:02 PM	2	0	1	1	1:38 PM	5	0	4	4
1:03 PM	5	2	0	2	1:39 PM	4	2	2	4
1:04 PM	3	2	0	2	1:40 PM	8	2	9	11
1:05 PM	5	1	6	7	1:41 PM	1	2	0	2
1:06 PM	2	2	0	2	1:42 PM	9	4	1	5
1:07 PM	0	0	0	0	1:43 PM	1	0	2	2
1:08 PM	1	0	0	0	1:44 PM	2	2	0	2
1:09 PM	0	0	2	2	1:45 PM	0	1	1	2
1:10 PM	0	0	0	0	1:46 PM	0	0	0	0
1:11 PM	0	0	0	0	1:47 PM	7	0	2	2
1:12 PM	6	0	3	3	1:48 PM	2	1	1	2
1:13 PM	2	3	0	3	1:49 PM	3	2	0	2
1:14 PM	1	1	0	1	1:50 PM	2	1	2	3
1:15 PM	0	0	0	0	1:51 PM	2	0	0	0
1:16 PM	4	3	0	3	1:52 PM	4	1	4	5
1:17 PM	8	2	7	9	1:53 PM	2	1	0	1
1:18 PM	0	0	1	1	1:54 PM	4	2	0	2
1:19 PM	3	1	2	3	1:55 PM	0	0	0	0
1:20 PM	2	1	0	1	1:56 PM	2	1	0	1
1:21 PM	6	3	0	3	1:57 PM	1	1	1	2
1:22 PM	4	1	2	3	1:58 PM	3	1	2	3
1:23 PM	3	2	0	2	1:59 PM	4	2	0	2
1:24 PM	2	1	0	1	2:00 PM	1	0	2	2
1:25 PM	2	0	2	2	2:01 PM	0	0	1	1
1:26 PM	1	2	0	2	2:02 PM	2	2	0	2
1:27 PM	0	1	0	1	2:03 PM	6	4	6	10
1:28 PM	5	1	3	4	2:04 PM	3	1	2	3
1:29 PM	5	2	4	6	2:05 PM	3	3	1	4
1:30 PM	1	1	1	2	2:06 PM	5	3	0	3
1:31 PM	2	1	0	1	2:07 PM	0	0	0	0
1:32 PM	0	1	0	1	2:08 PM	0	0	0	0
1:33 PM	2	1	4	5	2:09 PM	2	1	1	2
1:34 PM	0	0	1	1	2:10 PM	1	1	0	1
1:35 PM	1	0	1	1	2:11 PM	1	0	2	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:12 PM	3	2	1	3	2:48 PM	0	0	0	0
2:13 PM	9	2	5	7	2:49 PM	2	1	0	1
2:14 PM	5	1	5	6	2:50 PM	1	0	2	2
2:15 PM	1	1	1	2	2:51 PM	11	1	12	13
2:16 PM	1	1	0	1	2:52 PM	2	0	1	1
2:17 PM	3	1	2	3	2:53 PM	0	0	2	2
2:18 PM	3	1	0	1	2:54 PM	2	2	0	2
2:19 PM	2	2	3	5	2:55 PM	2	2	0	2
2:20 PM	1	1	0	1	2:56 PM	4	0	0	0
2:21 PM	3	1	1	2	2:57 PM	5	3	3	6
2:22 PM	1	1	3	4	2:58 PM	3	1	0	1
2:23 PM	2	1	1	2	2:59 PM	5	2	0	2
2:24 PM	4	0	4	4	3:00 PM	0	0	0	0
2:25 PM	8	1	4	5	3:01 PM	0	0	0	0
2:26 PM	5	4	0	4	3:02 PM	0	0	0	0
2:27 PM	3	0	1	1	3:03 PM	5	1	3	4
2:28 PM	1	1	2	3	3:04 PM	10	3	6	9
2:29 PM	3	1	1	2	3:05 PM	1	1	0	1
2:30 PM	2	0	2	2	3:06 PM	1	1	1	2
2:31 PM	2	0	2	2	3:07 PM	4	1	0	1
2:32 PM	0	1	0	1	3:08 PM	1	0	1	1
2:33 PM	3	1	1	2	3:09 PM	5	1	1	2
2:34 PM	6	0	3	3	3:10 PM	0	0	0	0
2:35 PM	3	3	1	4	3:11 PM	2	1	0	1
2:36 PM	0	1	2	3	3:12 PM	0	1	1	2
2:37 PM	2	2	6	8	3:13 PM	0	0	0	0
2:38 PM	7	1	0	1	3:14 PM	1	0	1	1
2:39 PM	4	0	5	5	3:15 PM	6	2	0	2
2:40 PM	6	1	1	2	3:16 PM	8	1	6	7
2:41 PM	0	0	3	3	3:17 PM	9	1	7	8
2:42 PM	2	2	1	3	3:18 PM	0	0	0	0
2:43 PM	3	0	0	0	3:19 PM	4	3	0	3
2:44 PM	0	0	0	0	3:20 PM	2	1	2	3
2:45 PM	7	2	5	7	3:21 PM	3	1	2	3
2:46 PM	1	1	0	1	3:22 PM	5	3	2	5
2:47 PM	2	2	0	2	3:23 PM	0	0	1	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
3:24 PM	1	1	1	2	4:00 PM	1	0	0	0
3:25 PM	0	1	0	1	4:01 PM	2	2	2	4
3:26 PM	1	0	1	1	4:02 PM	5	4	0	4
3:27 PM	4	3	2	5	4:03 PM	4	1	1	2
3:28 PM	2	2	2	4	4:04 PM	1	2	1	3
3:29 PM	5	2	5	7	4:05 PM	3	2	2	4
3:30 PM	1	2	3	5	4:06 PM	3	3	1	4
3:31 PM	2	0	2	2	4:07 PM	2	0	1	1
3:32 PM	0	3	0	3	4:08 PM	2	1	2	3
3:33 PM	1	2	4	6	4:09 PM	4	1	2	3
3:34 PM	0	0	1	1	4:10 PM	0	0	2	2
3:35 PM	2	2	2	4	4:11 PM	4	2	2	4
3:36 PM	5	0	0	0	4:12 PM	7	1	1	2
3:37 PM	2	2	0	2	4:13 PM	6	0	8	8
3:38 PM	2	1	2	3	4:14 PM	9	1	11	12
3:39 PM	4	3	1	4	4:15 PM	6	3	0	3
3:40 PM	2	0	1	1	4:16 PM	6	2	1	3
3:41 PM	2	1	2	3	4:17 PM	0	0	2	2
3:42 PM	2	0	0	0	4:18 PM	3	0	0	0
3:43 PM	2	0	0	0	4:19 PM	1	2	2	4
3:44 PM	5	3	0	3	4:20 PM	2	0	1	1
3:45 PM	1	0	1	1	4:21 PM	1	0	0	0
3:46 PM	0	0	0	0	4:22 PM	1	0	2	2
3:47 PM	1	1	1	2	4:23 PM	4	2	2	4
3:48 PM	7	0	8	8	4:24 PM	0	0	0	0
3:49 PM	5	0	6	6	4:25 PM	1	0	1	1
3:50 PM	5	1	2	3	4:26 PM	0	0	1	1
3:51 PM	6	2	1	3	4:27 PM	3	1	2	3
3:52 PM	2	1	0	1	4:28 PM	7	3	1	4
3:53 PM	2	2	1	3	4:29 PM	4	1	1	2
3:54 PM	1	0	1	1	4:30 PM	0	1	0	1
3:55 PM	2	1	1	2	4:31 PM	6	2	3	5
3:56 PM	0	0	1	1	4:32 PM	3	1	0	1
3:57 PM	2	1	1	2	4:33 PM	3	2	1	3
3:58 PM	5	3	0	3	4:34 PM	5	2	1	3
3:59 PM	1	1	0	1	4:35 PM	2	1	1	2

Local Time	iCone	Video		
	No. Reads	Coming	Going	Total
4:36 PM	2	0	0	0
4:37 PM	4	2	0	2
4:38 PM	0	1	1	2
4:39 PM	8	4	1	5
4:40 PM	6	2	3	5
4:41 PM	2	1	1	2
4:42 PM	0	1	1	2
4:43 PM	7	1	1	2
4:44 PM	2	1	1	2
4:45 PM	3	4	1	5
4:46 PM	2	1	1	2
4:47 PM	5	1	1	2
4:48 PM	0	0	0	0
4:49 PM	0	1	0	1
4:50 PM	3	2	0	2
4:51 PM	0	0	0	0
4:52 PM	6	3	4	7
Total	570	263	280	543

Table A.16 US 24 inside and around Beloit, KS on August 20, 2014. 1st iCone

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
8:49 AM	8	1	0	1	9:25 AM	11	1	4	5
8:50 AM	7	3	0	3	9:26 AM	4	2	1	3
8:51 AM	3	1	0	1	9:27 AM	7	1	0	1
8:52 AM	0	0	0	0	9:28 AM	0	0	0	0
8:53 AM	4	2	0	2	9:29 AM	9	3	0	3
8:54 AM	5	3	0	3	9:30 AM	6	0	1	1
8:55 AM	3	1	0	1	9:31 AM	2	1	0	1
8:56 AM	10	3	2	5	9:32 AM	2	1	0	1
8:57 AM	0	0	0	0	9:33 AM	4	1	0	1
8:58 AM	0	0	0	0	9:34 AM	6	3	0	3
8:59 AM	6	0	2	2	9:35 AM	7	3	3	6
9:00 AM	6	2	0	2	9:36 AM	6	1	0	1
9:01 AM	3	2	1	3	9:37 AM	2	2	1	3
9:02 AM	6	2	1	3	9:38 AM	2	1	0	1
9:03 AM	4	0	1	1	9:47 AM	4	1	6	7
9:04 AM	2	0	0	0	9:48 AM	8	1	1	2
9:05 AM	3	0	1	1	9:49 AM	0	1	0	1
9:06 AM	8	3	0	3	9:50 AM	8	0	2	2
9:07 AM	7	2	0	2	9:51 AM	7	2	0	2
9:08 AM	3	1	1	2	9:52 AM	4	0	1	1
9:09 AM	5	2	1	3	9:53 AM	2	0	1	1
9:10 AM	2	1	0	1	9:54 AM	5	3	0	3
9:11 AM	5	0	2	2	9:55 AM	7	2	3	5
9:12 AM	6	1	2	3	9:56 AM	6	3	0	3
9:13 AM	5	3	1	4	9:57 AM	5	0	1	1
9:14 AM	0	0	0	0	9:58 AM	12	3	2	5
9:15 AM	7	0	3	3	9:59 AM	2	0	4	4
9:16 AM	6	1	1	2	10:00 AM	7	1	0	1
9:17 AM	5	0	0	0	10:01 AM	12	1	1	2
9:18 AM	10	4	3	7	10:02 AM	5	2	0	2
9:19 AM	4	1	0	1	10:03 AM	0	2	1	3
9:20 AM	6	3	0	3	10:04 AM	6	2	0	2
9:21 AM	4	3	0	3	10:05 AM	4	1	1	2
9:22 AM	6	3	0	3	10:06 AM	8	4	0	4
9:23 AM	0	0	0	0	10:07 AM	8	1	0	1
9:24 AM	2	0	2	2	10:08 AM	8	1	0	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:09 AM	7	4	2	6	10:45 AM	4	0	0	0
10:10 AM	4	0	0	0	10:46 AM	6	2	0	2
10:11 AM	0	0	0	0	10:47 AM	8	1	3	4
10:12 AM	6	1	2	3	10:48 AM	1	0	0	0
10:13 AM	4	0	0	0	10:49 AM	12	2	4	6
10:14 AM	7	2	3	5	10:50 AM	0	3	1	4
10:15 AM	11	4	0	4	10:51 AM	4	1	2	3
10:16 AM	10	6	1	7	10:52 AM	8	1	1	2
10:17 AM	5	2	3	5	10:53 AM	10	0	3	3
10:18 AM	0	0	0	0	10:54 AM	0	4	0	4
10:19 AM	5	1	1	2	10:55 AM	0	3	0	3
10:20 AM	5	2	2	4	10:56 AM	6	1	0	1
10:21 AM	6	0	4	4	10:57 AM	0	3	1	4
10:22 AM	5	1	2	3	10:58 AM	5	0	0	0
10:23 AM	2	3	0	3	10:59 AM	11	2	1	3
10:24 AM	0	2	3	5	11:00 AM	0	1	6	7
10:25 AM	3	0	1	1	11:01 AM	5	1	3	4
10:26 AM	13	0	0	0	11:02 AM	6	0	0	0
10:27 AM	5	3	0	3	11:03 AM	6	1	1	2
10:28 AM	4	4	2	6	11:04 AM	1	0	1	1
10:29 AM	4	2	0	2	11:05 AM	14	0	0	0
10:30 AM	0	3	0	3	11:06 AM	2	1	1	2
10:31 AM	4	0	0	0	11:07 AM	4	2	0	2
10:32 AM	9	0	0	0	11:08 AM	4	0	0	0
10:33 AM	5	3	3	6	11:09 AM	3	3	1	4
10:34 AM	10	3	8	11	11:10 AM	2	0	4	4
10:35 AM	8	1	0	1	11:11 AM	5	1	0	1
10:36 AM	2	1	1	2	11:12 AM	5	2	4	6
10:37 AM	0	0	0	0	11:13 AM	7	2	2	4
10:38 AM	2	0	0	0	11:14 AM	4	1	0	1
10:39 AM	5	2	1	3	11:15 AM	5	1	3	4
10:40 AM	4	1	0	1	11:16 AM	12	1	1	2
10:41 AM	4	0	2	2	11:17 AM	0	1	0	1
10:42 AM	7	1	5	6	11:18 AM	7	2	0	2
10:43 AM	5	0	2	2	11:19 AM	0	0	0	0
10:44 AM	9	0	0	0	11:20 AM	0	1	1	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:21 AM	0	2	1	3	11:57 AM	9	2	3	5
11:22 AM	0	2	0	2	11:58 AM	3	0	0	0
11:23 AM	4	1	6	7	11:59 AM	7	2	0	2
11:24 AM	8	1	0	1	12:00 PM	5	3	1	4
11:25 AM	0	1	1	2	12:01 PM	4	1	2	3
11:26 AM	8	1	1	2	12:07 PM	5	0	0	0
11:27 AM	5	0	0	0	12:08 PM	9	1	1	2
11:28 AM	5	0	0	0	12:09 PM	5	2	1	3
11:29 AM	5	0	0	0	12:10 PM	3	3	0	3
11:30 AM	6	1	0	1	12:11 PM	2	1	2	3
11:31 AM	5	1	1	2	12:12 PM	7	3	0	3
11:32 AM	8	0	1	1	12:13 PM	6	0	1	1
11:33 AM	0	0	1	1	12:14 PM	7	0	3	3
11:34 AM	1	1	3	4	12:15 PM	2	0	1	1
11:35 AM	1	4	0	4	12:16 PM	8	2	0	2
11:36 AM	6	1	0	1	12:17 PM	13	0	1	1
11:37 AM	0	0	0	0	12:18 PM	8	1	1	2
11:38 AM	8	3	2	5	12:19 PM	4	1	5	6
11:39 AM	5	0	2	2	12:20 PM	2	1	1	2
11:40 AM	9	2	3	5	12:21 PM	3	2	2	4
11:41 AM	0	1	0	1	12:22 PM	0	2	0	2
11:42 AM	8	0	0	0	12:23 PM	0	1	0	1
11:43 AM	2	2	1	3	12:24 PM	10	0	3	3
11:44 AM	6	0	0	0	12:25 PM	3	2	1	3
11:45 AM	3	1	1	2	12:26 PM	7	1	1	2
11:46 AM	5	1	0	1	12:27 PM	7	2	0	2
11:47 AM	8	2	7	9	12:28 PM	11	1	1	2
11:48 AM	3	3	0	3	12:29 PM	10	2	5	7
11:49 AM	6	1	1	2	12:30 PM	7	1	3	4
11:50 AM	4	2	0	2	12:31 PM	6	1	3	4
11:51 AM	0	1	1	2	12:32 PM	2	0	0	0
11:52 AM	9	1	2	3	12:33 PM	3	2	0	2
11:53 AM	10	0	0	0	12:34 PM	6	1	0	1
11:54 AM	4	2	1	3	12:35 PM	3	0	0	0
11:55 AM	3	1	2	3	12:36 PM	6	1	2	3
11:56 AM	5	0	1	1	12:42 PM	5	3	0	3

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:43 PM	2	4	1	5	1:10 PM	6	1	0	1
12:44 PM	6	1	0	1	1:11 PM	6	1	0	1
12:45 PM	4	3	0	3	1:12 PM	10	2	0	2
12:46 PM	2	2	1	3	1:13 PM	6	3	1	4
12:47 PM	2	1	2	3	1:14 PM	8	2	2	4
12:48 PM	8	1	1	2	1:15 PM	5	0	2	2
12:49 PM	3	0	0	0	1:16 PM	5	0	3	3
12:50 PM	6	2	2	4	1:17 PM	11	2	2	4
12:51 PM	2	2	0	2	1:18 PM	0	2	0	2
12:52 PM	2	2	2	4	1:19 PM	4	2	0	2
12:53 PM	5	1	0	1	1:20 PM	5	1	0	1
12:54 PM	2	1	0	1	1:21 PM	11	3	1	4
12:55 PM	5	0	1	1	1:22 PM	4	2	0	2
12:56 PM	8	1	1	2	1:23 PM	6	1	0	1
12:57 PM	5	3	0	3	1:24 PM	8	2	0	2
12:58 PM	7	6	1	7	1:25 PM	11	0	0	0
12:59 PM	3	0	2	2	1:26 PM	4	0	0	0
1:00 PM	7	2	1	3	1:27 PM	0	3	1	4
1:01 PM	0	0	1	1	1:28 PM	5	0	2	2
1:02 PM	6	0	6	6	1:29 PM	0	3	5	8
1:03 PM	1	1	0	1	1:30 PM	2	0	3	3
1:04 PM	6	1	0	1	1:31 PM	7	1	1	2
1:05 PM	5	0	3	3	1:32 PM	0	1	2	3
1:06 PM	4	2	1	3	1:33 PM	1	1	4	5
1:07 PM	3	0	1	1	1:34 PM	6	4	0	4
1:08 PM	0	1	1	2	Total	610	177	139	316
1:09 PM	5	1	0	1					

Table A.17 US 24 inside and around Beloit, KS on August 20, 2014. 2nd iCone (Continue)

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:04 AM	0	2	0	2	9:40 AM	0	0	0	0
9:05 AM	6	1	1	2	9:41 AM	3	2	0	2
9:06 AM	8	1	7	8	9:42 AM	0	0	0	0
9:07 AM	3	2	2	4	9:43 AM	3	3	2	5
9:08 AM	2	1	0	1	9:44 AM	2	1	0	1
9:09 AM	0	1	0	1	9:45 AM	6	0	11	11
9:10 AM	1	0	3	3	9:46 AM	6	1	2	3
9:11 AM	2	0	4	4	9:47 AM	1	2	0	2
9:12 AM	6	2	0	2	9:48 AM	3	1	1	2
9:13 AM	3	0	0	0	9:49 AM	3	1	2	3
9:14 AM	0	0	0	0	9:50 AM	7	1	3	4
9:15 AM	4	0	1	1	9:51 AM	1	0	2	2
9:16 AM	3	0	1	1	9:52 AM	1	0	0	0
9:17 AM	1	0	0	0	9:53 AM	0	1	1	2
9:18 AM	3	1	2	3	9:54 AM	5	1	0	1
9:19 AM	5	1	1	2	9:55 AM	4	2	4	6
9:20 AM	0	0	0	0	9:56 AM	7	1	0	1
9:21 AM	1	1	1	2	9:57 AM	5	4	0	4
9:22 AM	1	0	1	1	9:58 AM	5	1	1	2
9:23 AM	3	1	1	2	9:59 AM	5	0	0	0
9:24 AM	4	1	1	2	10:00 AM	0	1	0	1
9:25 AM	3	3	0	3	10:01 AM	5	2	0	2
9:26 AM	2	3	0	3	10:02 AM	2	0	0	0
9:27 AM	2	0	0	0	10:03 AM	1	1	1	2
9:28 AM	0	0	0	0	10:04 AM	6	1	0	1
9:29 AM	0	0	1	1	10:05 AM	0	0	0	0
9:30 AM	0	1	0	1	10:06 AM	1	1	0	1
9:31 AM	9	1	6	7	10:07 AM	5	0	8	8
9:32 AM	1	1	1	2	10:08 AM	3	0	2	2
9:33 AM	2	1	0	1	10:09 AM	8	3	3	6
9:34 AM	0	0	1	1	10:10 AM	0	0	1	1
9:35 AM	2	1	1	2	10:11 AM	1	0	1	1
9:36 AM	2	1	0	1	10:12 AM	1	2	0	2
9:37 AM	4	2	2	4	10:13 AM	9	3	0	3
9:38 AM	2	1	1	2	10:14 AM	0	1	0	1
9:39 AM	2	0	3	3	10:15 AM	2	2	0	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:16 AM	4	0	1	1	10:52 AM	5	2	0	2
10:17 AM	0	3	0	3	10:53 AM	2	1	0	1
10:18 AM	0	1	5	6	10:54 AM	3	0	0	0
10:19 AM	0	1	1	2	10:55 AM	3	1	0	1
10:20 AM	1	2	1	3	10:56 AM	2	0	0	0
10:21 AM	5	0	0	0	10:57 AM	3	0	1	1
10:22 AM	2	2	1	3	10:58 AM	3	2	8	10
10:23 AM	5	0	1	1	10:59 AM	6	0	0	0
10:24 AM	0	2	0	2	11:00 AM	0	2	0	2
10:25 AM	0	0	1	1	11:01 AM	3	0	0	0
10:26 AM	2	0	2	2	11:02 AM	0	1	0	1
10:27 AM	0	0	0	0	11:03 AM	1	0	0	0
10:28 AM	3	2	0	2	11:04 AM	0	0	1	1
10:29 AM	0	1	0	1	11:05 AM	2	0	1	1
10:30 AM	3	0	0	0	11:06 AM	4	2	0	2
10:31 AM	0	0	0	0	11:07 AM	0	1	0	1
10:32 AM	0	2	0	2	11:08 AM	3	2	1	3
10:33 AM	6	1	2	3	11:09 AM	2	0	2	2
10:34 AM	5	0	4	4	11:10 AM	6	2	5	7
10:35 AM	3	1	0	1	11:11 AM	2	2	1	3
10:36 AM	2	1	1	2	11:12 AM	1	2	1	3
10:37 AM	2	2	0	2	11:13 AM	2	0	0	0
10:38 AM	9	4	2	6	11:14 AM	1	0	1	1
10:39 AM	5	2	2	4	11:15 AM	3	1	1	2
10:40 AM	4	0	0	0	11:16 AM	5	3	1	4
10:41 AM	0	0	0	0	11:17 AM	0	2	0	2
10:42 AM	1	0	1	1	11:18 AM	3	0	2	2
10:43 AM	0	0	3	3	11:19 AM	1	1	0	1
10:44 AM	3	2	1	3	11:20 AM	3	2	5	7
10:45 AM	6	2	1	3	11:21 AM	4	1	0	1
10:46 AM	1	0	1	1	11:22 AM	1	0	0	0
10:47 AM	1	0	0	0	11:23 AM	0	0	0	0
10:48 AM	4	3	0	3	11:24 AM	1	0	1	1
10:49 AM	0	0	0	0	11:25 AM	1	0	1	1
10:50 AM	0	0	1	1	11:26 AM	3	2	0	2
10:51 AM	0	1	0	1	11:27 AM	4	1	2	3

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:28 AM	1	0	0	0	12:04 PM	6	4	1	5
11:29 AM	0	2	0	2	12:05 PM	3	0	0	0
11:30 AM	4	2	1	3	12:06 PM	0	0	1	1
11:31 AM	2	1	0	1	12:07 PM	2	1	3	4
11:32 AM	4	2	6	8	12:08 PM	4	1	5	6
11:33 AM	7	3	1	4	12:09 PM	0	2	1	3
11:34 AM	4	1	1	2	12:10 PM	1	0	3	3
11:35 AM	1	0	1	1	12:11 PM	2	2	3	5
11:36 AM	1	3	1	4	12:16 PM	5	0	2	2
11:37 AM	8	2	3	5	12:17 PM	4	1	0	1
11:38 AM	2	1	1	2	12:18 PM	1	0	0	0
11:39 AM	2	1	1	2	12:19 PM	1	2	2	4
11:40 AM	1	0	0	0	12:20 PM	1	4	3	7
11:41 AM	0	2	0	2	12:21 PM	6	2	3	5
11:42 AM	4	2	0	2	12:22 PM	4	0	1	1
11:43 AM	5	1	1	2	12:23 PM	4	0	1	1
11:44 AM	1	2	4	6	12:24 PM	0	1	2	3
11:45 AM	0	0	4	4	12:25 PM	1	0	1	1
11:46 AM	0	0	0	0	12:26 PM	2	0	0	0
11:47 AM	1	7	1	8	12:27 PM	0	2	0	2
11:48 AM	9	1	0	1	12:28 PM	0	1	0	1
11:49 AM	1	1	0	1	12:29 PM	4	6	1	7
11:50 AM	2	2	0	2	12:30 PM	1	2	0	2
11:51 AM	3	1	0	1	12:31 PM	6	1	0	1
11:52 AM	2	0	1	1	12:32 PM	2	0	1	1
11:53 AM	0	1	0	1	12:33 PM	2	2	3	5
11:54 AM	0	0	0	0	12:34 PM	0	2	2	4
11:55 AM	1	0	2	2	12:35 PM	3	0	4	4
11:56 AM	1	0	0	0	12:36 PM	3	3	2	5
11:57 AM	1	2	2	4	12:37 PM	6	1	0	1
11:58 AM	5	1	4	5	12:38 PM	4	1	2	3
11:59 AM	6	0	7	7	12:39 PM	0	2	2	4
12:00 PM	1	1	0	1	12:40 PM	0	0	0	0
12:01 PM	2	2	3	5	12:41 PM	5	0	0	0
12:02 PM	7	2	0	2	12:42 PM	0	1	0	1
12:03 PM	3	2	2	4	12:43 PM	0	1	2	3

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:44 PM	1	0	1	1	1:20 PM	2	0	1	1
12:45 PM	2	1	2	3	1:21 PM	2	3	0	3
12:46 PM	1	0	1	1	1:22 PM	0	0	1	1
12:47 PM	3	1	2	3	1:23 PM	3	2	1	3
12:48 PM	0	3	1	4	1:24 PM	0	0	1	1
12:49 PM	1	0	4	4	1:25 PM	6	0	1	1
12:50 PM	7	0	5	5	1:26 PM	2	0	2	2
12:51 PM	5	3	0	3	1:27 PM	2	2	0	2
12:52 PM	3	0	0	0	1:28 PM	3	0	4	4
12:53 PM	3	1	2	3	1:29 PM	5	1	3	4
12:54 PM	2	1	0	1	1:30 PM	6	0	2	2
12:55 PM	0	1	2	3	1:31 PM	1	0	1	1
12:56 PM	3	0	0	0	1:32 PM	0	0	2	2
12:57 PM	4	3	1	4	1:33 PM	1	2	2	4
12:58 PM	0	1	1	2	1:34 PM	5	2	1	3
12:59 PM	3	1	0	1	1:35 PM	4	2	0	2
1:00 PM	1	2	0	2	1:36 PM	0	1	0	1
1:01 PM	2	3	2	5	1:37 PM	3	1	1	2
1:02 PM	4	1	1	2	1:38 PM	3	1	1	2
1:03 PM	4	3	10	13	1:39 PM	3	0	0	0
1:04 PM	4	3	0	3	1:40 PM	0	0	5	5
1:05 PM	5	2	0	2	1:41 PM	5	2	0	2
1:06 PM	3	1	0	1	1:42 PM	3	3	1	4
1:07 PM	3	0	1	1	1:43 PM	8	0	1	1
1:08 PM	1	1	1	2	1:44 PM	1	2	1	3
1:09 PM	0	2	0	2	1:45 PM	4	2	1	3
1:10 PM	2	2	0	2	1:46 PM	5	2	1	3
1:11 PM	1	0	1	1	1:47 PM	3	1	0	1
1:12 PM	1	1	1	2	1:48 PM	3	0	1	1
1:13 PM	1	0	0	0	1:49 PM	1	0	3	3
1:14 PM	3	1	2	3	1:50 PM	1	1	0	1
1:15 PM	0	1	1	2	1:51 PM	0	1	7	8
1:16 PM	2	1	10	11	1:52 PM	9	1	3	4
1:17 PM	1	1	2	3	1:53 PM	6	0	0	0
1:18 PM	7	1	3	4	1:54 PM	1	0	0	0
1:19 PM	3	1	2	3	1:55 PM	0	2	0	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
1:56 PM	1	1	0	1	2:32 PM	4	1	1	2
1:57 PM	1	2	0	2	2:33 PM	2	0	0	0
1:58 PM	4	0	1	1	2:34 PM	0	1	1	2
1:59 PM	0	0	2	2	2:35 PM	2	3	0	3
2:00 PM	1	1	0	1	2:36 PM	3	1	1	2
2:01 PM	1	1	1	2	2:37 PM	3	1	0	1
2:02 PM	0	2	0	2	2:38 PM	2	0	0	0
2:03 PM	3	1	0	1	2:39 PM	0	0	0	0
2:04 PM	1	1	8	9	2:40 PM	0	1	1	2
2:05 PM	6	4	0	4	2:41 PM	0	1	1	2
2:06 PM	7	1	0	1	2:42 PM	3	2	7	9
2:07 PM	0	2	1	3	2:43 PM	5	0	3	3
2:08 PM	3	0	1	1	2:44 PM	5	1	1	2
2:09 PM	3	1	3	4	2:45 PM	2	0	0	0
2:10 PM	8	1	1	2	2:46 PM	2	0	0	0
2:11 PM	1	0	0	0	2:47 PM	0	2	1	3
2:12 PM	0	1	1	2	2:48 PM	1	0	2	2
2:13 PM	4	3	1	4	2:49 PM	7	0	0	0
2:14 PM	5	2	1	3	2:50 PM	0	0	0	0
2:15 PM	1	1	4	5	2:51 PM	0	0	0	0
2:16 PM	4	1	3	4	2:52 PM	0	1	0	1
2:17 PM	4	2	1	3	2:53 PM	0	1	0	1
2:18 PM	3	0	0	0	2:54 PM	0	1	1	2
2:19 PM	2	2	0	2	2:55 PM	4	0	5	5
2:20 PM	2	7	1	8	2:56 PM	3	1	1	2
2:21 PM	9	1	0	1	2:57 PM	7	0	2	2
2:22 PM	6	3	2	5	2:58 PM	1	2	0	2
2:23 PM	0	0	2	2	2:59 PM	0	2	2	4
2:24 PM	1	1	1	2	3:00 PM	5	2	1	3
2:25 PM	3	0	0	0	3:01 PM	6	0	2	2
2:26 PM	0	1	1	2	3:02 PM	2	0	3	3
2:27 PM	2	0	0	0	3:03 PM	0	0	1	1
2:28 PM	0	0	0	0	3:04 PM	0	2	1	3
2:29 PM	0	0	7	7	3:05 PM	0	1	0	1
2:30 PM	5	5	0	5	3:06 PM	5	1	1	2
2:31 PM	1	1	0	1	3:07 PM	0	1	2	3

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
3:08 PM	3	0	1	1	3:44 PM	7	1	0	1
3:09 PM	2	1	0	1	3:45 PM	4	4	3	7
3:10 PM	3	1	0	1	3:46 PM	5	0	2	2
3:11 PM	0	1	0	1	3:47 PM	4	1	1	2
3:12 PM	2	0	0	0	3:48 PM	2	0	1	1
3:13 PM	0	1	1	2	3:49 PM	3	1	2	3
3:14 PM	0	0	0	0	3:50 PM	2	2	2	4
3:15 PM	2	0	1	1	3:51 PM	7	1	0	1
3:16 PM	0	0	2	2	3:52 PM	0	0	0	0
3:17 PM	1	0	2	2	3:53 PM	3	0	1	1
3:18 PM	1	1	5	6	3:54 PM	0	0	4	4
3:19 PM	6	0	0	0	3:55 PM	0	1	6	7
3:20 PM	3	1	1	2	3:56 PM	10	2	1	3
3:21 PM	1	0	0	0	3:57 PM	1	2	0	2
3:22 PM	1	1	1	2	3:58 PM	3	0	1	1
3:23 PM	0	1	2	3	3:59 PM	3	2	1	3
3:24 PM	3	0	1	1	4:00 PM	1	0	0	0
3:25 PM	2	0	0	0	4:01 PM	2	2	2	4
3:26 PM	0	0	1	1	4:02 PM	1	1	0	1
3:27 PM	1	0	0	0	4:03 PM	5	0	0	0
3:28 PM	0	4	0	4	4:04 PM	0	0	2	2
3:29 PM	7	0	2	2	4:05 PM	0	2	2	4
3:30 PM	2	1	7	8	4:06 PM	5	1	8	9
3:31 PM	4	1	0	1	4:07 PM	7	1	2	3
3:32 PM	4	1	0	1	4:08 PM	4	3	4	7
3:33 PM	2	1	1	2	4:09 PM	1	1	2	3
3:34 PM	2	3	0	3	4:10 PM	3	0	1	1
3:35 PM	3	1	3	4	4:11 PM	2	1	1	2
3:36 PM	4	1	1	2	4:12 PM	3	0	2	2
3:37 PM	2	0	1	1	4:13 PM	1	0	0	0
3:38 PM	4	0	0	0	4:14 PM	0	0	1	1
3:39 PM	0	0	1	1	4:15 PM	0	0	1	1
3:40 PM	1	1	0	1	4:16 PM	0	0	0	0
3:41 PM	0	0	1	1	4:17 PM	0	4	9	13
3:42 PM	1	1	1	2	4:18 PM	1	4	4	8
3:43 PM	0	3	5	8	4:19 PM	9	1	3	4

Local Time	iCone	Video		
	No. Reads	Coming	Going	Total
4:20 PM	4	0	1	1
4:21 PM	2	0	3	3
4:22 PM	1	0	2	2
4:23 PM	0	1	1	2
4:24 PM	6	0	2	2
4:25 PM	1	1	0	1
4:26 PM	5	1	1	2
4:27 PM	0	0	2	2
4:28 PM	3	1	0	1
4:29 PM	0	1	0	1
4:30 PM	3	0	2	2
4:31 PM	3	2	2	4
4:32 PM	1	0	1	1
4:33 PM	3	3	2	5
4:34 PM	1	3	2	5
4:35 PM	6	4	1	5
4:36 PM	6	1	1	2
4:37 PM	5	3	1	4
4:38 PM	2	0	1	1
4:39 PM	3	0	0	0
4:40 PM	1	2	3	5
4:41 PM	2	1	1	2
4:42 PM	4	1	2	3
4:43 PM	3	0	9	9
4:44 PM	9	2	2	4
4:45 PM	2	0	0	0
4:46 PM	2	3	1	4
4:47 PM	0	2	0	2
4:48 PM	7	1	0	1
4:49 PM	1	1	1	2
4:50 PM	1	1	1	2
Total	588	266	309	575

Table A.18 US 24 inside and around Beloit, KS on August 21, 2014. 1st iCone

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
8:43 AM	0	0	0	0	9:19 AM	0	0	0	0
8:44 AM	0	0	0	0	9:20 AM	2	3	0	3
8:45 AM	1	1	0	1	9:21 AM	3	0	0	0
8:46 AM	0	0	0	0	9:22 AM	0	1	0	1
8:47 AM	0	0	5	5	9:23 AM	3	0	0	0
8:48 AM	12	1	4	5	9:24 AM	2	1	0	1
8:49 AM	4	0	0	0	9:25 AM	0	1	0	1
8:50 AM	1	0	0	0	9:26 AM	2	1	0	1
8:51 AM	5	1	0	1	9:27 AM	5	0	9	9
8:52 AM	0	0	0	0	9:28 AM	4	0	0	0
8:53 AM	0	0	0	0	9:29 AM	4	2	0	2
8:54 AM	1	1	0	1	9:30 AM	2	1	1	2
8:55 AM	3	1	0	1	9:31 AM	2	0	1	1
8:56 AM	5	0	0	0	9:32 AM	2	1	0	1
8:57 AM	1	1	0	1	9:33 AM	4	2	0	2
8:58 AM	1	3	0	3	9:34 AM	2	0	1	1
8:59 AM	5	0	0	0	9:35 AM	0	0	0	0
9:00 AM	0	0	3	3	9:36 AM	2	0	0	0
9:01 AM	7	0	5	5	9:37 AM	1	1	0	1
9:02 AM	1	2	0	2	9:38 AM	0	1	0	1
9:03 AM	4	2	1	3	9:39 AM	1	0	1	1
9:04 AM	1	1	0	1	9:40 AM	7	1	12	13
9:05 AM	0	0	0	0	9:41 AM	10	1	0	1
9:06 AM	3	2	0	2	9:42 AM	1	1	1	2
9:07 AM	0	0	0	0	9:43 AM	5	1	0	1
9:08 AM	1	2	0	2	9:44 AM	6	1	0	1
9:09 AM	1	0	0	0	9:45 AM	4	0	0	0
9:10 AM	0	0	0	0	9:46 AM	0	3	0	3
9:11 AM	0	0	0	0	9:47 AM	6	1	0	1
9:12 AM	0	0	0	0	9:48 AM	2	0	0	0
9:13 AM	0	0	0	0	9:49 AM	0	0	0	0
9:14 AM	3	4	3	7	9:50 AM	0	2	0	2
9:15 AM	6	0	0	0	9:51 AM	6	1	0	1
9:16 AM	1	3	0	3	9:52 AM	0	0	10	10
9:17 AM	6	2	0	2	9:53 AM	4	3	2	5
9:18 AM	2	0	0	0	9:54 AM	9	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:55 AM	2	0	0	0	10:31 AM	0	0	1	1
9:56 AM	1	1	1	2	10:32 AM	1	2	0	2
9:57 AM	2	0	0	0	10:33 AM	3	2	0	2
9:58 AM	0	2	0	2	10:34 AM	5	1	7	8
9:59 AM	3	1	0	1	10:35 AM	5	0	0	0
10:00 AM	2	0	0	0	10:36 AM	0	0	1	1
10:01 AM	0	0	0	0	10:37 AM	3	1	0	1
10:02 AM	0	0	0	0	10:38 AM	2	1	0	1
10:03 AM	0	1	0	1	10:39 AM	0	1	0	1
10:04 AM	1	1	1	2	10:40 AM	1	0	0	0
10:05 AM	2	0	0	0	10:41 AM	0	0	1	1
10:06 AM	1	2	1	3	10:42 AM	1	1	0	1
10:07 AM	4	1	0	1	10:43 AM	1	2	0	2
10:08 AM	3	1	6	7	10:44 AM	4	2	0	2
10:09 AM	6	0	0	0	10:45 AM	6	2	0	2
10:10 AM	1	0	1	1	10:46 AM	2	0	2	2
10:11 AM	0	0	0	0	10:47 AM	2	0	1	1
10:12 AM	0	0	0	0	10:48 AM	1	0	0	0
10:13 AM	0	0	0	0	10:49 AM	0	0	0	0
10:14 AM	0	0	0	0	10:50 AM	0	1	0	1
10:15 AM	0	2	0	2	10:51 AM	1	0	1	1
10:16 AM	7	0	1	1	10:52 AM	1	2	1	3
10:17 AM	1	1	0	1	10:53 AM	3	1	3	4
10:18 AM	1	0	0	0	10:54 AM	7	1	7	8
10:19 AM	0	0	0	0	10:55 AM	8	3	0	3
10:20 AM	0	1	0	1	10:56 AM	6	1	0	1
10:21 AM	2	0	9	9	10:57 AM	3	0	0	0
10:22 AM	7	0	1	1	10:58 AM	0	1	0	1
10:23 AM	0	0	0	0	10:59 AM	1	1	0	1
10:24 AM	0	1	0	1	11:00 AM	1	0	5	5
10:25 AM	1	0	0	0	11:01 AM	7	0	0	0
10:26 AM	0	2	0	2	11:02 AM	1	0	1	1
10:27 AM	3	0	0	0	11:03 AM	2	1	0	1
10:28 AM	0	0	1	1	11:04 AM	1	2	0	2
10:29 AM	1	0	0	0	11:05 AM	1	0	1	1
10:30 AM	0	0	0	0	11:06 AM	2	1	1	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:07 AM	2	3	0	3	11:43 AM	7	1	1	2
11:08 AM	3	0	1	1	11:44 AM	3	1	0	1
11:09 AM	1	0	0	0	11:45 AM	1	0	0	0
11:10 AM	0	0	0	0	11:46 AM	3	1	0	1
11:11 AM	0	0	0	0	11:47 AM	2	0	0	0
11:12 AM	0	1	0	1	11:48 AM	0	3	0	3
11:13 AM	3	0	10	10	11:49 AM	5	0	0	0
11:14 AM	6	0	0	0	11:50 AM	0	0	0	0
11:15 AM	0	1	0	1	11:51 AM	0	2	0	2
11:16 AM	1	0	0	0	11:52 AM	3	4	5	9
11:17 AM	0	2	0	2	11:53 AM	10	0	2	2
11:18 AM	3	1	1	2	11:54 AM	4	0	2	2
11:19 AM	2	0	0	0	11:55 AM	4	1	0	1
11:20 AM	0	0	0	0	11:56 AM	3	1	0	1
11:21 AM	0	1	1	2	11:57 AM	1	5	0	5
11:22 AM	3	1	0	1	11:58 AM	4	2	7	9
11:23 AM	2	1	1	2	11:59 AM	9	1	0	1
11:24 AM	2	0	0	0	12:00 PM	0	1	0	1
11:25 AM	1	2	8	10	12:01 PM	2	0	1	1
11:26 AM	11	2	0	2	12:02 PM	1	2	0	2
11:27 AM	2	1	0	1	12:03 PM	3	1	0	1
11:28 AM	1	1	0	1	12:04 PM	0	2	0	2
11:29 AM	1	0	0	0	12:05 PM	5	1	3	4
11:30 AM	0	0	1	1	12:06 PM	2	0	4	4
11:31 AM	1	2	0	2	12:07 PM	7	2	1	3
11:32 AM	8	2	1	3	12:08 PM	4	1	0	1
11:33 AM	4	1	0	1	12:09 PM	2	1	0	1
11:34 AM	1	0	0	0	12:10 PM	1	0	1	1
11:35 AM	0	2	0	2	12:11 PM	1	2	0	2
11:36 AM	4	1	0	1	12:12 PM	2	0	0	0
11:37 AM	2	1	0	1	12:13 PM	0	0	1	1
11:38 AM	1	2	4	6	12:14 PM	0	0	1	1
11:39 AM	6	1	2	3	12:15 PM	0	0	2	2
11:40 AM	3	0	0	0	12:16 PM	4	0	2	2
11:41 AM	0	3	1	4	12:17 PM	4	2	0	2
11:42 AM	6	3	0	3	12:18 PM	2	0	2	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:19 PM	2	1	1	2	12:55 PM	5	0	0	0
12:20 PM	2	1	0	1	12:56 PM	1	1	1	2
12:21 PM	7	0	9	9	12:57 PM	3	0	1	1
12:22 PM	7	1	5	6	12:58 PM	4	1	2	3
12:23 PM	2	1	0	1	12:59 PM	0	0	0	0
12:24 PM	2	2	0	2	1:00 PM	0	1	0	1
12:25 PM	0	1	0	1	1:01 PM	3	0	0	0
12:26 PM	2	2	0	2	1:02 PM	1	2	1	3
12:27 PM	1	0	0	0	1:03 PM	8	0	8	8
12:28 PM	0	0	0	0	1:04 PM	8	0	1	1
12:29 PM	4	3	0	3	1:05 PM	0	0	0	0
12:30 PM	2	0	0	0	1:06 PM	2	2	0	2
12:31 PM	0	0	0	0	1:07 PM	1	0	0	0
12:32 PM	0	1	0	1	1:08 PM	0	0	0	0
12:33 PM	2	0	0	0	1:09 PM	0	0	0	0
12:34 PM	0	2	12	14	1:10 PM	0	0	0	0
12:35 PM	6	0	0	0	1:11 PM	1	0	1	1
12:36 PM	7	1	0	1	1:12 PM	5	1	0	1
12:37 PM	2	0	0	0	1:13 PM	3	2	1	3
12:38 PM	0	1	1	2	1:14 PM	0	0	1	1
12:39 PM	2	1	0	1	1:15 PM	2	1	0	1
12:40 PM	4	0	2	2	1:16 PM	1	0	0	0
12:41 PM	0	0	0	0	1:17 PM	0	2	6	8
12:42 PM	0	0	0	0	1:18 PM	6	1	3	4
12:43 PM	0	0	0	0	1:19 PM	4	0	0	0
12:44 PM	0	0	0	0	1:20 PM	0	0	1	1
12:45 PM	1	0	1	1	1:21 PM	1	0	0	0
12:46 PM	0	1	1	2	1:22 PM	0	0	0	0
12:47 PM	5	2	2	4	1:23 PM	0	1	0	1
12:48 PM	5	1	0	1	1:24 PM	1	0	0	0
12:49 PM	2	1	9	10	1:25 PM	0	0	0	0
12:50 PM	8	0	1	1	1:26 PM	2	2	1	3
12:51 PM	1	1	0	1	1:27 PM	3	1	0	1
12:52 PM	1	1	0	1	1:28 PM	3	0	0	0
12:53 PM	3	2	0	2	1:29 PM	0	0	0	0
12:54 PM	2	0	4	4	1:30 PM	0	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
1:31 PM	0	0	2	2	2:07 PM	0	3	0	3
1:32 PM	5	1	5	6	2:08 PM	3	0	0	0
1:33 PM	3	0	0	0	2:09 PM	1	1	0	1
1:34 PM	0	0	0	0	2:10 PM	0	2	3	5
1:35 PM	0	1	0	1	2:11 PM	9	0	1	1
1:36 PM	1	2	1	3	2:12 PM	1	1	0	1
1:37 PM	5	1	0	1	2:13 PM	1	1	0	1
1:38 PM	2	1	0	1	2:14 PM	2	0	0	0
1:39 PM	3	2	0	2	2:15 PM	0	0	0	0
1:40 PM	1	1	1	2	2:16 PM	0	0	0	0
1:41 PM	2	0	0	0	2:17 PM	0	1	0	1
1:42 PM	0	1	0	1	2:18 PM	2	1	7	8
1:43 PM	1	0	0	0	2:19 PM	10	1	0	1
1:44 PM	1	1	0	1	2:20 PM	2	1	0	1
1:45 PM	0	2	2	4	2:21 PM	1	0	0	0
1:46 PM	6	0	3	3	2:22 PM	0	0	1	1
1:47 PM	4	1	3	4	2:23 PM	1	1	1	2
1:48 PM	6	1	0	1	2:24 PM	2	1	0	1
1:49 PM	9	1	0	1	2:25 PM	1	0	0	0
1:50 PM	1	2	0	2	2:26 PM	0	1	0	1
1:51 PM	4	1	0	1	2:27 PM	1	1	0	1
1:52 PM	0	0	0	0	2:28 PM	3	1	0	1
1:53 PM	2	1	0	1	2:29 PM	2	2	2	4
1:54 PM	2	1	0	1	2:30 PM	5	0	1	1
1:55 PM	1	1	1	2	2:31 PM	1	1	1	2
1:56 PM	3	1	0	1	2:32 PM	2	1	0	1
1:57 PM	1	1	0	1	2:33 PM	2	0	4	4
1:58 PM	1	0	1	1	2:34 PM	6	0	4	4
1:59 PM	2	3	0	3	2:35 PM	3	3	0	3
2:00 PM	6	2	1	3	2:36 PM	4	2	0	2
2:01 PM	4	0	7	7	2:37 PM	1	0	0	0
2:02 PM	7	2	3	5	2:38 PM	1	0	0	0
2:03 PM	7	0	0	0	2:39 PM	0	2	0	2
2:04 PM	0	0	0	0	2:40 PM	2	2	0	2
2:05 PM	0	1	0	1	2:41 PM	2	2	1	3
2:06 PM	1	0	0	0	2:42 PM	3	1	0	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:43 PM	2	0	0	0	3:19 PM	0	0	0	0
2:44 PM	0	1	0	1	3:20 PM	2	2	0	2
2:45 PM	1	1	0	1	3:21 PM	2	1	1	2
2:46 PM	2	2	2	4	3:22 PM	2	2	0	2
2:47 PM	3	2	4	6	3:23 PM	2	0	0	0
2:48 PM	4	0	1	1	3:24 PM	2	0	0	0
2:49 PM	2	1	0	1	3:25 PM	0	0	0	0
2:50 PM	1	0	0	0	3:26 PM	0	1	2	3
2:51 PM	0	1	0	1	3:27 PM	3	5	0	5
2:52 PM	1	1	0	1	3:28 PM	8	0	1	1
2:53 PM	1	0	0	0	3:29 PM	5	3	0	3
2:54 PM	0	3	1	4	3:30 PM	2	0	0	0
2:55 PM	5	0	0	0	3:31 PM	3	1	4	5
2:56 PM	2	1	0	1	3:32 PM	6	1	1	2
2:57 PM	1	0	0	0	3:33 PM	3	1	0	1
2:58 PM	3	0	1	1	3:34 PM	1	0	0	0
2:59 PM	1	1	0	1	3:35 PM	0	7	0	7
3:00 PM	1	1	0	1	3:36 PM	5	1	0	1
3:01 PM	2	1	0	1	3:37 PM	5	4	2	6
3:02 PM	0	0	9	9	3:38 PM	8	0	2	2
3:03 PM	7	0	0	0	3:39 PM	3	1	2	3
3:04 PM	2	0	0	0	3:40 PM	3	0	3	3
3:05 PM	0	4	0	4	3:41 PM	5	3	2	5
3:06 PM	4	1	0	1	3:42 PM	6	3	1	4
3:07 PM	2	0	2	2	3:43 PM	3	3	0	3
3:08 PM	3	0	0	0	3:44 PM	6	2	1	3
3:09 PM	0	0	0	0	3:45 PM	6	0	0	0
3:10 PM	0	1	0	1	3:46 PM	2	0	0	0
3:11 PM	1	0	0	0	3:47 PM	0	2	0	2
3:12 PM	0	2	0	2	3:48 PM	1	0	8	8
3:13 PM	5	0	0	0	3:49 PM	3	1	0	1
3:14 PM	0	4	2	6	3:50 PM	1	0	0	0
3:15 PM	5	0	0	0	3:51 PM	0	1	0	1
3:16 PM	0	0	1	1	3:52 PM	2	0	0	0
3:17 PM	1	1	5	6	3:53 PM	0	0	1	1
3:18 PM	7	1	0	1	3:54 PM	0	2	1	3

Local Time	iCone	Video		
	No. Reads	Coming	Going	Total
3:55 PM	3	3	1	4
3:56 PM	5	0	3	3
3:57 PM	2	1	2	3
3:58 PM	5	1	0	1
3:59 PM	2	2	2	4
4:00 PM	4	1	2	3
4:01 PM	1	1	1	2
4:02 PM	4	1	1	2
4:03 PM	2	1	0	1
4:04 PM	2	2	0	2
4:05 PM	2	1	0	1
4:06 PM	0	0	8	8
4:07 PM	6	1	4	5
4:08 PM	8	0	0	0
4:09 PM	0	1	0	1
4:10 PM	0	2	0	2
4:11 PM	2	0	1	1
4:12 PM	3	1	0	1
4:13 PM	2	0	6	6
4:14 PM	6	1	1	2
4:15 PM	4	5	0	5
4:16 PM	4	1	0	1
4:17 PM	2	2	2	4
4:18 PM	3	2	0	2
4:19 PM	4	1	1	2
4:20 PM	0	0	0	0
4:21 PM	0	0	0	0
4:22 PM	2	0	6	6
4:23 PM	5	1	0	1
4:24 PM	0	1	2	3
4:25 PM	2	0	0	0
4:26 PM	2	1	0	1
Total	535	202	223	425

Table A.19 US 24 inside and around Beloit, KS on August 21, 2014. 2nd iCone

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
8:35 AM	4	2	0	2	9:16 AM	8	2	1	3
8:36 AM	4	1	2	3	9:17 AM	2	2	2	4
8:37 AM	0	0	0	0	9:18 AM	3	1	0	1
8:38 AM	0	0	0	0	9:19 AM	0	1	0	1
8:39 AM	1	1	0	1	9:20 AM	8	0	0	0
8:40 AM	2	0	0	0	9:21 AM	11	0	10	10
8:41 AM	10	1	7	8	9:22 AM	1	1	4	5
8:42 AM	7	0	4	4	9:23 AM	2	0	0	0
8:43 AM	0	0	0	0	9:24 AM	2	2	0	2
8:44 AM	2	1	0	1	9:25 AM	5	0	0	0
8:45 AM	3	2	1	3	9:26 AM	7	1	1	2
8:46 AM	2	0	0	0	9:27 AM	2	3	1	4
8:47 AM	2	1	1	2	9:28 AM	0	0	1	1
8:48 AM	3	1	1	2	9:29 AM	4	2	0	2
8:49 AM	7	1	2	3	9:30 AM	4	1	0	1
8:50 AM	6	4	2	6	9:31 AM	2	2	0	2
8:51 AM	4	2	0	2	9:32 AM	5	2	0	2
8:52 AM	5	3	0	3	9:33 AM	5	3	3	6
8:53 AM	0	0	0	0	9:34 AM	10	2	2	4
8:54 AM	2	1	0	1	9:35 AM	4	0	2	2
9:00 AM	0	0	0	0	9:36 AM	2	1	2	3
9:01 AM	10	0	0	0	9:37 AM	1	1	0	1
9:02 AM	5	3	5	8	9:38 AM	0	0	0	0
9:03 AM	0	2	0	2	9:39 AM	4	0	0	0
9:04 AM	1	0	0	0	9:40 AM	7	1	1	2
9:05 AM	3	1	0	1	9:41 AM	1	4	0	4
9:06 AM	4	2	0	2	9:42 AM	6	0	2	2
9:07 AM	10	1	0	1	9:43 AM	4	3	0	3
9:08 AM	4	0	8	8	9:44 AM	3	3	0	3
9:09 AM	1	2	0	2	9:45 AM	8	0	7	7
9:10 AM	4	0	0	0	9:46 AM	6	4	3	7
9:11 AM	5	2	0	2	9:47 AM	11	1	0	1
9:12 AM	6	5	1	6	9:48 AM	3	0	0	0
9:13 AM	6	1	2	3	9:49 AM	0	0	0	0
9:14 AM	1	0	0	0	9:50 AM	0	0	0	0
9:15 AM	2	1	0	1	9:51 AM	1	0	0	0

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:52 AM	4	0	1	1	10:28 AM	5	1	3	4
9:53 AM	3	4	0	4	10:29 AM	2	2	1	3
9:54 AM	3	0	1	1	10:38 AM	4	0	0	0
9:55 AM	1	1	1	2	10:39 AM	4	1	0	1
9:56 AM	9	2	2	4	10:40 AM	11	0	0	0
9:57 AM	2	0	0	0	10:41 AM	3	0	5	5
9:58 AM	0	1	0	1	10:42 AM	7	0	0	0
9:59 AM	5	0	0	0	10:43 AM	5	0	0	0
10:00 AM	10	4	0	4	10:44 AM	1	3	0	3
10:01 AM	10	0	3	3	10:45 AM	0	2	1	3
10:02 AM	2	1	5	6	10:46 AM	5	1	0	1
10:03 AM	3	1	0	1	10:47 AM	8	3	1	4
10:04 AM	3	0	0	0	10:48 AM	5	3	4	7
10:05 AM	7	3	0	3	10:49 AM	2	1	0	1
10:06 AM	3	1	1	2	10:50 AM	4	0	4	4
10:07 AM	7	1	0	1	10:51 AM	0	0	1	1
10:08 AM	0	3	0	3	10:52 AM	6	0	1	1
10:09 AM	1	0	0	0	10:53 AM	8	1	0	1
10:10 AM	6	1	1	2	10:54 AM	6	1	0	1
10:11 AM	3	3	1	4	10:55 AM	1	2	5	7
10:12 AM	0	1	1	2	10:56 AM	6	2	0	2
10:13 AM	2	0	0	0	10:57 AM	2	1	0	1
10:14 AM	1	1	0	1	10:58 AM	0	1	0	1
10:15 AM	14	1	4	5	10:59 AM	0	0	1	1
10:16 AM	2	1	6	7	11:00 AM	8	3	1	4
10:17 AM	4	0	0	0	11:01 AM	2	1	2	3
10:18 AM	0	2	0	2	11:02 AM	2	1	0	1
10:19 AM	0	0	0	0	11:03 AM	0	2	0	2
10:20 AM	5	1	0	1	11:04 AM	6	1	1	2
10:21 AM	6	2	0	2	11:05 AM	2	1	0	1
10:22 AM	3	2	1	3	11:06 AM	7	0	0	0
10:23 AM	2	1	0	1	11:07 AM	4	0	6	6
10:24 AM	8	2	1	3	11:08 AM	7	0	1	1
10:25 AM	4	2	2	4	11:09 AM	2	1	0	1
10:26 AM	4	1	1	2	11:10 AM	0	1	0	1
10:27 AM	3	1	0	1	11:11 AM	2	2	1	3

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:12 AM	5	2	0	2	11:48 AM	1	0	0	0
11:13 AM	4	3	1	4	11:49 AM	1	0	2	2
11:14 AM	0	0	0	0	11:50 AM	6	1	0	1
11:15 AM	0	2	0	2	11:51 AM	3	1	0	1
11:16 AM	3	2	2	4	11:52 AM	8	4	0	4
11:17 AM	7	0	0	0	11:53 AM	7	0	0	0
11:18 AM	2	1	0	1	11:54 AM	2	2	2	4
11:19 AM	6	0	0	0	11:55 AM	0	2	1	3
11:20 AM	1	1	9	10	11:56 AM	3	0	1	1
11:21 AM	2	0	0	0	11:57 AM	3	2	0	2
11:22 AM	4	0	0	0	11:58 AM	0	1	0	1
11:23 AM	1	1	0	1	11:59 AM	12	0	4	4
11:24 AM	3	3	1	4	12:00 PM	0	0	9	9
11:25 AM	6	1	1	2	12:01 PM	4	0	1	1
11:26 AM	2	1	1	2	12:02 PM	2	1	0	1
11:27 AM	3	2	0	2	12:03 PM	3	2	0	2
11:28 AM	1	0	0	0	12:04 PM	0	2	0	2
11:29 AM	3	1	2	3	12:05 PM	4	0	0	0
11:30 AM	6	0	1	1	12:06 PM	9	5	2	7
11:31 AM	0	1	0	1	12:07 PM	8	0	1	1
11:32 AM	3	0	0	0	12:08 PM	7	4	0	4
11:33 AM	2	1	7	8	12:09 PM	2	1	0	1
11:34 AM	3	2	0	2	12:10 PM	1	1	0	1
11:35 AM	5	0	1	1	12:11 PM	2	0	0	0
11:36 AM	1	2	0	2	12:12 PM	4	3	0	3
11:37 AM	4	1	0	1	12:13 PM	0	0	4	4
11:38 AM	10	1	0	1	12:14 PM	2	0	7	7
11:39 AM	13	2	0	2	12:15 PM	7	1	2	3
11:40 AM	2	1	0	1	12:16 PM	2	0	0	0
11:41 AM	3	0	1	1	12:17 PM	2	1	0	1
11:42 AM	1	1	1	2	12:25 PM	6	2	0	2
11:43 AM	3	3	1	4	12:26 PM	0	2	0	2
11:44 AM	3	1	0	1	12:27 PM	5	1	0	1
11:45 AM	8	0	2	2	12:28 PM	5	0	0	0
11:46 AM	2	2	13	15	12:29 PM	2	2	1	3
11:47 AM	7	1	0	1	12:30 PM	2	0	3	3

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:31 PM	2	1	1	2	1:07 PM	3	2	0	2
12:32 PM	2	2	0	2	1:08 PM	5	1	1	2
12:33 PM	4	1	0	1	1:09 PM	6	3	1	4
12:34 PM	2	0	1	1	1:10 PM	2	5	0	5
12:35 PM	6	5	0	5	1:11 PM	2	1	7	8
12:36 PM	8	1	0	1	1:12 PM	7	0	0	0
12:37 PM	4	1	0	1	1:13 PM	2	2	1	3
12:38 PM	3	1	0	1	1:14 PM	2	3	0	3
12:39 PM	4	1	0	1	1:15 PM	3	1	1	2
12:40 PM	0	2	0	2	1:16 PM	7	1	0	1
12:41 PM	4	1	0	1	1:17 PM	1	2	0	2
12:42 PM	2	2	0	2	1:18 PM	6	1	0	1
12:43 PM	2	2	5	7	1:19 PM	5	1	0	1
12:44 PM	1	0	2	2	1:20 PM	2	1	0	1
12:45 PM	2	1	1	2	1:21 PM	0	1	0	1
12:46 PM	4	1	2	3	1:22 PM	0	3	1	4
12:47 PM	7	1	0	1	1:23 PM	0	2	0	2
12:48 PM	1	3	0	3	1:24 PM	4	0	0	0
12:49 PM	2	2	0	2	1:25 PM	4	0	11	11
12:50 PM	0	1	0	1	1:26 PM	0	0	0	0
12:51 PM	10	1	0	1	1:27 PM	7	1	0	1
12:52 PM	2	0	0	0	1:28 PM	2	0	0	0
12:53 PM	0	1	4	5	1:29 PM	2	0	0	0
12:54 PM	1	0	1	1	1:30 PM	5	0	0	0
12:55 PM	2	1	2	3	1:31 PM	2	5	0	5
12:56 PM	0	1	0	1	1:32 PM	4	0	0	0
12:57 PM	2	0	1	1	1:33 PM	10	2	0	2
12:58 PM	4	0	5	5	1:34 PM	12	2	0	2
12:59 PM	7	1	1	2	1:35 PM	1	2	0	2
1:00 PM	0	2	0	2	1:36 PM	3	1	0	1
1:01 PM	5	0	0	0	1:37 PM	0	2	0	2
1:02 PM	5	1	0	1	1:38 PM	0	2	2	4
1:03 PM	5	0	0	0	1:39 PM	5	2	0	2
1:04 PM	11	1	2	3	1:40 PM	11	3	5	8
1:05 PM	5	0	0	0	1:41 PM	4	3	1	4
1:06 PM	3	2	1	3	1:42 PM	5	0	1	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
1:43 PM	2	1	0	1	2:19 PM	1	1	0	1
1:44 PM	1	0	0	0	2:20 PM	8	1	1	2
1:45 PM	5	0	0	0	2:21 PM	2	2	1	3
1:46 PM	0	4	0	4	2:22 PM	4	0	1	1
1:47 PM	11	3	0	3	2:23 PM	5	0	0	0
1:48 PM	8	1	1	2	2:24 PM	2	7	2	9
1:49 PM	5	1	0	1	2:25 PM	0	0	1	1
1:50 PM	1	0	0	0	2:26 PM	3	0	3	3
1:51 PM	5	2	0	2	2:27 PM	0	1	2	3
1:52 PM	2	0	1	1	2:28 PM	3	1	1	2
1:53 PM	4	0	4	4	2:29 PM	3	0	1	1
1:54 PM	2	0	14	14	2:30 PM	4	0	1	1
1:55 PM	2	0	0	0	2:31 PM	2	0	0	0
1:56 PM	3	3	0	3	2:32 PM	5	0	0	0
1:57 PM	0	2	0	2	2:33 PM	7	1	0	1
1:58 PM	1	0	1	1	2:34 PM	10	1	0	1
1:59 PM	4	0	1	1	2:35 PM	4	2	0	2
2:00 PM	0	1	0	1	2:36 PM	7	0	0	0
2:01 PM	5	1	0	1	2:37 PM	7	3	0	3
2:02 PM	5	2	1	3	2:38 PM	5	0	0	0
2:03 PM	1	1	0	1	2:39 PM	2	2	1	3
2:04 PM	14	0	0	0	2:40 PM	3	0	5	5
2:05 PM	2	1	0	1	2:41 PM	5	3	3	6
2:06 PM	2	2	0	2	2:42 PM	0	2	1	3
2:07 PM	1	1	1	2	2:43 PM	0	4	0	4
2:08 PM	3	1	0	1	2:44 PM	5	4	1	5
2:09 PM	2	3	0	3	2:45 PM	0	0	1	1
2:10 PM	1	1	6	7	2:46 PM	2	1	1	2
2:11 PM	5	1	6	7	2:47 PM	8	2	1	3
2:12 PM	2	0	0	0	2:48 PM	14	0	1	1
2:13 PM	0	2	0	2	2:49 PM	4	0	0	0
2:14 PM	5	1	0	1	2:50 PM	2	1	0	1
2:15 PM	6	1	0	1	2:51 PM	0	2	0	2
2:16 PM	4	1	0	1	2:52 PM	5	1	0	1
2:17 PM	3	1	1	2	2:53 PM	4	1	0	1
2:18 PM	7	0	0	0	2:54 PM	2	3	13	16

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:55 PM	5	2	8	10	3:31 PM	5	1	0	1
2:56 PM	4	0	0	0	3:32 PM	3	1	0	1
2:57 PM	1	1	0	1	3:33 PM	5	3	0	3
2:58 PM	6	4	1	5	3:34 PM	11	3	0	3
2:59 PM	5	1	0	1	3:35 PM	8	0	2	2
3:00 PM	3	1	0	1	3:36 PM	7	0	0	0
3:01 PM	5	2	0	2	3:37 PM	1	3	1	4
3:02 PM	3	0	2	2	3:38 PM	5	2	2	4
3:03 PM	6	0	1	1	3:39 PM	11	3	0	3
3:04 PM	7	2	0	2	3:40 PM	4	0	3	3
3:05 PM	7	3	2	5	3:41 PM	2	1	8	9
3:06 PM	0	2	0	2	3:42 PM	5	0	3	3
3:07 PM	7	2	0	2	3:43 PM	2	2	3	5
3:08 PM	7	1	1	2	3:44 PM	5	0	1	1
3:09 PM	0	1	7	8	3:45 PM	4	2	3	5
3:10 PM	4	0	3	3	3:46 PM	5	4	2	6
3:11 PM	4	3	1	4	3:47 PM	12	1	1	2
3:12 PM	0	0	0	0	3:48 PM	5	4	0	4
3:13 PM	0	2	0	2	3:49 PM	6	2	0	2
3:14 PM	6	4	0	4	3:50 PM	3	1	2	3
3:15 PM	0	1	0	1	3:51 PM	4	2	0	2
3:16 PM	1	1	0	1	3:52 PM	14	2	1	3
3:17 PM	10	1	2	3	3:53 PM	7	3	2	5
3:18 PM	7	0	0	0	3:54 PM	3	3	0	3
3:19 PM	9	0	0	0	3:55 PM	4	1	0	1
3:20 PM	2	4	1	5	3:56 PM	2	0	2	2
3:21 PM	4	0	0	0	3:57 PM	3	0	1	1
3:22 PM	2	1	0	1	3:58 PM	11	2	9	11
3:23 PM	2	0	4	4	3:59 PM	1	0	10	10
3:24 PM	0	1	11	12	4:00 PM	3	0	2	2
3:25 PM	3	3	0	3	4:01 PM	4	3	0	3
3:26 PM	7	1	3	4	4:02 PM	9	1	0	1
3:27 PM	2	3	1	4	4:03 PM	1	0	0	0
3:28 PM	8	0	1	1	4:04 PM	3	1	4	5
3:29 PM	2	2	0	2	4:05 PM	3	1	0	1
3:30 PM	1	0	0	0	4:06 PM	6	1	1	2

Local Time	iCone	Video		
	No. Reads	Coming	Going	Total
4:07 PM	2	1	0	1
4:08 PM	11	0	6	6
4:09 PM	5	2	1	3
4:10 PM	3	1	0	1
4:11 PM	12	3	2	5
4:12 PM	7	2	1	3
4:13 PM	0	0	0	0
4:14 PM	0	0	5	5
4:15 PM	4	1	10	11
4:16 PM	1	3	2	5
4:17 PM	5	2	1	3
4:18 PM	1	3	1	4
4:19 PM	4	0	2	2
4:20 PM	5	0	0	0
4:21 PM	0	2	0	2
4:22 PM	9	0	1	1
Total	850	271	259	530

Table A.20 US 50 near Newton, KS on August 26, 2014. 1st iCone

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:24 AM	6	4	0	4	11:01 AM	4	2	0	2
10:25 AM	1	3	0	3	11:02 AM	5	5	0	5
10:26 AM	4	1	0	1	11:03 AM	13	2	4	6
10:27 AM	2	2	0	2	11:04 AM	11	2	14	16
10:28 AM	9	5	4	9	11:05 AM	3	1	9	10
10:30 AM	18	1	3	4	11:06 AM	3	2	0	2
10:31 AM	11	3	12	15	11:07 AM	5	4	0	4
10:32 AM	0	3	4	7	11:08 AM	9	5	0	5
10:33 AM	1	1	1	2	11:09 AM	6	5	0	5
10:34 AM	3	1	0	1	11:10 AM	1	2	1	3
10:35 AM	1	2	0	2	11:11 AM	4	1	1	2
10:36 AM	2	1	0	1	11:12 AM	0	3	0	3
10:37 AM	3	1	0	1	11:13 AM	5	0	0	0
10:38 AM	4	7	0	7	11:14 AM	5	4	0	4
10:39 AM	1	1	0	1	11:15 AM	3	3	0	3
10:40 AM	3	1	1	2	11:16 AM	3	3	0	3
10:41 AM	0	1	0	1	11:17 AM	3	2	0	2
10:42 AM	5	1	0	1	11:18 AM	5	1	0	1
10:43 AM	2	4	0	4	11:19 AM	12	3	6	9
10:44 AM	4	2	0	2	11:20 AM	13	2	18	20
10:45 AM	3	4	1	5	11:21 AM	0	4	8	12
10:46 AM	13	1	5	6	11:22 AM	7	1	0	1
10:47 AM	12	2	13	15	11:23 AM	3	2	0	2
10:48 AM	9	2	16	18	11:24 AM	4	2	0	2
10:49 AM	7	2	3	5	11:25 AM	6	5	1	6
10:50 AM	5	5	1	6	11:26 AM	1	2	0	2
10:51 AM	1	4	0	4	11:27 AM	4	3	0	3
10:52 AM	7	3	0	3	11:28 AM	1	2	0	2
10:53 AM	2	4	0	4	11:29 AM	1	1	0	1
10:54 AM	2	1	0	1	11:30 AM	2	0	0	0
10:55 AM	5	2	0	2	11:31 AM	0	1	0	1
10:56 AM	1	3	2	5	11:32 AM	2	1	0	1
10:57 AM	5	1	0	1	11:33 AM	6	2	0	2
10:58 AM	3	3	0	3	11:34 AM	3	2	0	2
10:59 AM	2	2	0	2	11:35 AM	1	3	0	3
11:00 AM	6	4	0	4	11:36 AM	3	0	1	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:37 AM	9	4	1	5	12:13 PM	3	1	0	1
11:38 AM	13	2	13	15	12:14 PM	3	1	0	1
11:39 AM	9	3	12	15	12:15 PM	4	3	0	3
11:40 AM	7	0	9	9	12:16 PM	2	3	0	3
11:41 AM	1	0	2	2	12:17 PM	3	2	0	2
11:42 AM	6	2	0	2	12:18 PM	1	1	0	1
11:43 AM	9	7	0	7	12:19 PM	6	3	1	4
11:44 AM	3	3	0	3	12:20 PM	1	2	0	2
11:45 AM	3	4	0	4	12:21 PM	2	3	0	3
11:46 AM	1	2	0	2	12:22 PM	11	3	0	3
11:47 AM	1	2	0	2	12:23 PM	4	7	3	10
11:48 AM	4	0	0	0	12:24 PM	6	3	0	3
11:49 AM	5	6	0	6	12:25 PM	4	4	0	4
11:50 AM	1	3	0	3	12:26 PM	4	2	0	2
11:51 AM	5	0	0	0	12:27 PM	13	3	5	8
11:52 AM	3	4	0	4	12:28 PM	14	2	15	17
11:53 AM	9	3	0	3	12:29 PM	5	1	11	12
11:54 AM	12	0	12	12	12:30 PM	2	2	2	4
11:55 AM	11	1	14	15	12:31 PM	3	1	0	1
11:56 AM	7	0	14	14	12:32 PM	4	4	0	4
11:57 AM	0	1	0	1	12:33 PM	2	2	0	2
11:58 AM	3	0	0	0	12:34 PM	0	1	0	1
11:59 AM	5	3	0	3	12:35 PM	4	1	0	1
12:00 PM	2	3	1	4	12:36 PM	4	5	0	5
12:01 PM	3	3	0	3	12:37 PM	3	1	0	1
12:02 PM	3	2	0	2	12:38 PM	5	3	0	3
12:03 PM	5	3	0	3	12:39 PM	4	3	0	3
12:04 PM	5	4	0	4	12:40 PM	3	3	0	3
12:05 PM	1	3	0	3	12:41 PM	3	3	1	4
12:06 PM	1	1	0	1	12:42 PM	4	3	0	3
12:07 PM	3	1	1	2	12:43 PM	1	2	0	2
12:08 PM	4	2	0	2	12:44 PM	11	5	1	6
12:09 PM	10	4	1	5	12:45 PM	15	3	19	22
12:10 PM	14	2	21	23	12:46 PM	14	0	13	13
12:11 PM	2	3	4	7	12:47 PM	9	0	14	14
12:12 PM	1	1	1	2	12:48 PM	5	3	10	13

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:49 PM	0	1	0	1	1:25 PM	4	4	0	4
12:50 PM	1	0	0	0	1:26 PM	3	3	0	3
12:51 PM	0	1	0	1	1:27 PM	3	2	0	2
12:52 PM	1	0	0	0	1:28 PM	8	4	0	4
12:53 PM	1	1	0	1	1:29 PM	6	4	0	4
12:54 PM	3	3	0	3	1:30 PM	0	2	0	2
12:55 PM	4	2	1	3	1:31 PM	2	1	0	1
12:56 PM	5	4	1	5	1:32 PM	4	0	1	1
12:57 PM	0	1	0	1	1:33 PM	15	2	17	19
12:58 PM	3	0	0	0	1:34 PM	9	2	10	12
12:59 PM	2	3	1	4	1:35 PM	1	3	3	6
1:00 PM	5	3	0	3	1:36 PM	2	1	0	1
1:01 PM	11	5	3	8	1:37 PM	6	3	0	3
1:02 PM	13	1	20	21	1:38 PM	3	3	0	3
1:03 PM	8	2	15	17	1:39 PM	5	4	0	4
1:04 PM	5	2	0	2	1:40 PM	1	1	0	1
1:05 PM	3	6	1	7	1:41 PM	4	3	0	3
1:06 PM	2	1	0	1	1:42 PM	2	3	0	3
1:07 PM	1	3	0	3	1:43 PM	2	1	1	2
1:08 PM	4	2	0	2	1:44 PM	1	1	0	1
1:09 PM	3	3	0	3	1:45 PM	6	4	0	4
1:10 PM	5	3	0	3	1:46 PM	1	2	0	2
1:11 PM	2	3	0	3	1:47 PM	5	2	0	2
1:12 PM	3	1	0	1	1:48 PM	8	3	2	5
1:13 PM	3	3	0	3	1:49 PM	14	6	12	18
1:14 PM	4	2	1	3	1:50 PM	15	3	18	21
1:15 PM	4	2	0	2	1:51 PM	6	0	9	9
1:16 PM	6	2	0	2	1:52 PM	4	3	1	4
1:17 PM	16	0	16	16	1:53 PM	1	1	0	1
1:18 PM	13	1	15	16	1:54 PM	3	3	0	3
1:19 PM	6	4	8	12	1:55 PM	3	1	1	2
1:20 PM	3	2	0	2	1:56 PM	1	0	0	0
1:21 PM	8	4	0	4	1:57 PM	5	4	0	4
1:22 PM	1	5	0	5	1:58 PM	3	2	0	2
1:23 PM	1	0	0	0	1:59 PM	2	1	1	2
1:24 PM	5	3	0	3	2:00 PM	4	2	0	2

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:01 PM	3	3	0	3	2:37 PM	3	1	0	1
2:02 PM	1	1	2	3	2:38 PM	2	4	0	4
2:03 PM	11	2	4	6	2:39 PM	1	0	0	0
2:04 PM	13	3	13	16	2:40 PM	1	1	0	1
2:05 PM	12	3	14	17	2:41 PM	3	4	0	4
2:06 PM	9	1	13	14	2:42 PM	0	0	0	0
2:07 PM	1	2	0	2	2:43 PM	4	4	0	4
2:08 PM	1	0	0	0	2:44 PM	5	5	0	5
2:09 PM	1	2	0	2	2:45 PM	4	3	0	3
2:10 PM	0	1	0	1	2:46 PM	0	0	0	0
2:11 PM	1	1	0	1	2:47 PM	2	1	0	1
2:12 PM	5	1	0	1	2:48 PM	3	2	0	2
2:13 PM	3	1	0	1	2:49 PM	11	7	5	12
2:14 PM	2	2	1	3	2:50 PM	12	6	14	20
2:15 PM	4	1	0	1	2:51 PM	5	1	13	14
2:16 PM	3	4	0	4	2:52 PM	6	4	0	4
2:17 PM	4	2	0	2	2:53 PM	3	5	0	5
2:18 PM	13	4	4	8	2:54 PM	6	6	0	6
2:19 PM	12	2	18	20	2:55 PM	4	3	0	3
2:20 PM	13	1	18	19	2:56 PM	3	2	0	2
2:21 PM	4	0	6	6	2:57 PM	3	3	1	4
2:22 PM	4	3	0	3	2:58 PM	5	5	0	5
2:23 PM	5	6	0	6	2:59 PM	2	4	0	4
2:24 PM	0	0	0	0	3:00 PM	4	3	1	4
2:25 PM	2	1	0	1	3:01 PM	3	2	1	3
2:26 PM	5	3	0	3	3:02 PM	3	3	0	3
2:27 PM	2	2	0	2	3:03 PM	4	3	0	3
2:28 PM	5	2	1	3	3:04 PM	9	1	7	8
2:29 PM	5	7	0	7	3:05 PM	16	2	18	20
2:30 PM	1	0	0	0	3:06 PM	12	0	15	15
2:31 PM	2	2	0	2	3:07 PM	7	1	7	8
2:32 PM	5	3	0	3	3:08 PM	5	2	2	4
2:33 PM	4	2	1	3	3:09 PM	0	0	0	0
2:34 PM	15	4	16	20	3:10 PM	2	1	1	2
2:35 PM	12	1	13	14	3:11 PM	1	0	1	1
2:36 PM	2	1	6	7	3:57 PM	4	3	1	4

Local Time	iCone	Video		
	No. Reads	Coming	Going	Total
3:58 PM	4	2	1	3
3:59 PM	0	0	0	0
4:00 PM	4	2	4	6
4:01 PM	13	1	13	14
4:02 PM	15	4	11	15
4:03 PM	6	2	3	5
4:04 PM	5	2	4	6
4:05 PM	4	7	0	7
4:06 PM	9	3	0	3
4:07 PM	0	1	0	1
4:08 PM	4	2	0	2
4:09 PM	2	3	1	4
4:10 PM	4	4	0	4
4:11 PM	2	0	0	0
4:12 PM	2	5	0	5
4:13 PM	8	3	0	3
4:14 PM	1	1	1	2
4:15 PM	6	4	0	4
4:16 PM	3	2	0	2
4:17 PM	1	0	1	1
4:18 PM	6	4	0	4
4:19 PM	11	6	10	16
4:20 PM	13	2	17	19
4:21 PM	12	4	9	13
4:22 PM	4	1	0	1
4:23 PM	3	1	0	1
4:24 PM	4	7	0	7
4:25 PM	5	2	0	2
4:26 PM	3	0	2	2
4:27 PM	4	8	0	8
4:28 PM	7	2	1	3
4:29 PM	3	3	1	4
Total	852	411	463	874

Table A.21 US 50 near Newton, KS on August 27, 2014. 1st iCone

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
8:32 AM	3	3	0	3	9:08 AM	3	3	1	4
8:33 AM	11	4	0	4	9:09 AM	5	2	2	4
8:34 AM	6	2	0	2	9:10 AM	3	2	1	3
8:35 AM	7	3	6	9	9:11 AM	3	2	0	2
8:36 AM	3	1	1	2	9:12 AM	4	3	5	8
8:37 AM	9	3	1	4	9:13 AM	5	3	10	13
8:38 AM	2	2	2	4	9:14 AM	7	2	0	2
8:39 AM	3	6	0	6	9:15 AM	4	1	0	1
8:40 AM	9	3	8	11	9:16 AM	0	1	0	1
8:41 AM	8	2	14	16	9:17 AM	2	4	8	12
8:42 AM	5	1	2	3	9:18 AM	7	8	1	9
8:43 AM	1	3	0	3	9:19 AM	11	4	4	8
8:44 AM	10	2	0	2	9:20 AM	10	1	2	3
8:45 AM	4	5	0	5	9:21 AM	3	3	1	4
8:46 AM	8	2	0	2	9:22 AM	5	1	10	11
8:47 AM	4	4	0	4	9:23 AM	3	3	17	20
8:48 AM	4	3	4	7	9:24 AM	6	3	0	3
8:49 AM	7	2	0	2	9:25 AM	8	4	0	4
8:50 AM	4	7	1	8	9:26 AM	3	2	0	2
8:51 AM	13	2	4	6	9:32 AM	13	5	4	9
8:52 AM	10	5	17	22	9:33 AM	10	1	0	1
8:53 AM	9	4	8	12	9:34 AM	6	3	1	4
8:54 AM	1	1	0	1	9:35 AM	4	4	1	5
8:55 AM	3	1	0	1	9:36 AM	7	8	2	10
8:56 AM	1	2	0	2	9:37 AM	3	4	0	4
8:57 AM	4	3	1	4	9:38 AM	8	3	0	3
8:58 AM	6	2	7	9	9:39 AM	10	4	4	8
8:59 AM	3	1	2	3	9:40 AM	1	2	22	24
9:00 AM	2	0	1	1	9:41 AM	12	4	9	13
9:01 AM	0	0	0	0	9:42 AM	5	1	0	1
9:02 AM	0	1	0	1	9:43 AM	3	1	0	1
9:03 AM	1	2	17	19	9:44 AM	7	2	0	2
9:04 AM	10	1	5	6	9:45 AM	13	2	0	2
9:05 AM	1	1	1	2	9:46 AM	11	3	5	8
9:06 AM	1	1	0	1	9:47 AM	6	2	3	5
9:07 AM	3	3	3	6	9:48 AM	3	4	0	4

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:49 AM	5	3	0	3	10:25 AM	2	2	0	2
9:50 AM	6	5	1	6	10:26 AM	6	2	0	2
9:51 AM	4	0	16	16	10:27 AM	4	5	5	10
9:52 AM	2	1	13	14	10:28 AM	8	3	2	5
9:53 AM	7	2	0	2	10:29 AM	6	1	0	1
9:54 AM	2	2	0	2	10:30 AM	6	3	0	3
9:55 AM	5	5	0	5	10:31 AM	1	3	0	3
9:56 AM	2	2	5	7	10:32 AM	6	2	4	6
9:57 AM	8	1	0	1	10:33 AM	3	2	8	10
9:58 AM	5	3	0	3	10:34 AM	5	2	0	2
9:59 AM	2	4	0	4	10:35 AM	5	1	0	1
10:00 AM	10	1	0	1	10:36 AM	8	2	0	2
10:01 AM	4	1	8	9	10:37 AM	5	3	7	10
10:02 AM	9	2	13	15	10:38 AM	5	2	0	2
10:03 AM	0	2	0	2	10:39 AM	5	3	0	3
10:04 AM	3	6	0	6	10:40 AM	4	3	1	4
10:05 AM	4	2	0	2	10:41 AM	2	1	8	9
10:06 AM	8	2	2	4	10:42 AM	7	5	3	8
10:07 AM	6	2	1	3	10:43 AM	14	1	11	12
10:08 AM	8	2	0	2	10:44 AM	2	3	18	21
10:09 AM	8	1	1	2	10:45 AM	6	2	3	5
10:10 AM	2	3	1	4	10:46 AM	9	2	3	5
10:11 AM	11	1	2	3	10:47 AM	3	6	1	7
10:12 AM	12	3	9	12	10:48 AM	2	1	2	3
10:13 AM	0	3	18	21	10:49 AM	1	2	0	2
10:14 AM	4	1	1	2	10:50 AM	9	0	11	11
10:15 AM	6	7	0	7	10:51 AM	10	2	0	2
10:16 AM	7	4	1	5	10:52 AM	11	1	0	1
10:17 AM	4	2	0	2	10:53 AM	5	1	0	1
10:18 AM	4	2	5	7	10:54 AM	5	5	2	7
10:19 AM	11	4	1	5	10:55 AM	5	5	2	7
10:20 AM	2	1	3	4	10:56 AM	10	4	1	5
10:21 AM	5	2	1	3	10:57 AM	2	3	1	4
10:22 AM	5	2	9	11	10:58 AM	0	2	3	5
10:23 AM	7	4	12	16	10:59 AM	1	3	1	4
10:24 AM	3	2	0	2	11:00 AM	5	5	21	26

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:01 AM	0	1	1	2	11:37 AM	0	2	2	4
11:02 AM	9	0	0	0	11:38 AM	7	5	2	7
11:03 AM	16	0	1	1	11:39 AM	7	4	14	18
11:04 AM	5	4	0	4	11:40 AM	7	0	5	5
11:05 AM	8	0	1	1	11:41 AM	9	0	7	7
11:06 AM	11	5	1	6	11:42 AM	5	4	0	4
11:07 AM	4	6	2	8	11:43 AM	10	4	0	4
11:08 AM	6	1	3	4	11:44 AM	3	5	0	5
11:09 AM	11	4	9	13	11:45 AM	12	3	1	4
11:10 AM	5	4	14	18	11:46 AM	9	3	0	3
11:11 AM	6	2	2	4	11:47 AM	0	3	1	4
11:12 AM	8	3	0	3	11:48 AM	9	2	0	2
11:13 AM	2	7	0	7	11:49 AM	9	3	8	11
11:14 AM	5	3	0	3	11:50 AM	4	2	16	18
11:15 AM	9	2	3	5	11:51 AM	6	0	0	0
11:16 AM	0	5	3	8	11:52 AM	9	6	0	6
11:17 AM	8	1	1	2	11:53 AM	5	5	0	5
11:18 AM	6	2	0	2	11:54 AM	5	2	1	3
11:19 AM	1	1	15	16	11:55 AM	7	3	4	7
11:20 AM	7	0	13	13	11:56 AM	10	3	0	3
11:21 AM	4	6	2	8	11:57 AM	5	3	1	4
11:22 AM	5	3	0	3	11:58 AM	4	1	1	2
11:23 AM	9	0	0	0	11:59 AM	7	1	14	15
11:24 AM	6	4	0	4	12:00 PM	4	5	5	10
11:25 AM	1	1	9	10	12:01 PM	4	4	0	4
11:26 AM	6	3	0	3	12:02 PM	5	2	1	3
11:27 AM	2	2	4	6	12:03 PM	5	3	0	3
11:28 AM	3	3	4	7	12:04 PM	8	2	2	4
11:29 AM	4	1	0	1	12:05 PM	4	4	0	4
11:30 AM	6	5	18	23	12:06 PM	3	4	0	4
11:31 AM	4	1	0	1	12:07 PM	6	1	0	1
11:32 AM	0	1	0	1	12:08 PM	7	4	0	4
11:33 AM	6	3	0	3	12:09 PM	6	4	0	4
11:34 AM	9	4	0	4	12:10 PM	6	1	0	1
11:35 AM	11	3	9	12	12:11 PM	3	0	21	21
11:36 AM	4	1	1	2	12:12 PM	0	2	16	18

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:13 PM	5	3	11	14	12:49 PM	3	3	2	5
12:14 PM	7	3	0	3	12:50 PM	5	8	0	8
12:15 PM	10	2	0	2	12:51 PM	10	1	0	1
12:16 PM	4	0	0	0	12:52 PM	2	2	1	3
12:17 PM	2	4	1	5	12:53 PM	5	3	16	19
12:18 PM	4	4	6	10	12:54 PM	5	2	10	12
12:19 PM	9	6	0	6	12:55 PM	4	2	0	2
12:20 PM	11	3	1	4	12:56 PM	7	2	0	2
12:21 PM	11	1	2	3	12:57 PM	0	3	0	3
12:22 PM	5	3	0	3	12:58 PM	10	1	0	1
12:23 PM	7	1	17	18	12:59 PM	5	5	2	7
12:24 PM	3	2	6	8	1:00 PM	6	2	2	4
12:25 PM	2	6	0	6	1:01 PM	3	3	0	3
12:26 PM	6	4	0	4	1:02 PM	11	1	3	4
12:27 PM	2	3	0	3	1:03 PM	6	3	0	3
12:28 PM	3	2	4	6	1:04 PM	8	0	16	16
12:29 PM	8	4	1	5	1:05 PM	8	4	7	11
12:30 PM	12	2	0	2	1:06 PM	3	2	1	3
12:31 PM	9	2	0	2	1:07 PM	1	4	0	4
12:32 PM	0	2	0	2	1:08 PM	7	3	0	3
12:33 PM	3	6	1	7	1:09 PM	9	6	1	7
12:34 PM	3	2	19	21	1:10 PM	2	5	7	12
12:35 PM	11	2	6	8	1:11 PM	8	2	3	5
12:36 PM	2	0	1	1	1:12 PM	5	1	0	1
12:37 PM	2	2	0	2	1:13 PM	7	5	1	6
12:38 PM	6	3	0	3	1:14 PM	7	4	10	14
12:39 PM	12	4	2	6	1:15 PM	6	2	6	8
12:40 PM	7	3	2	5	1:16 PM	9	3	1	4
12:41 PM	4	3	1	4	1:17 PM	10	4	0	4
12:42 PM	2	0	3	3	1:18 PM	7	4	0	4
12:43 PM	3	4	2	6	1:19 PM	8	4	3	7
12:44 PM	3	8	12	20	1:20 PM	0	3	0	3
12:45 PM	13	1	7	8	1:21 PM	3	6	1	7
12:46 PM	6	2	1	3	1:22 PM	11	3	1	4
12:47 PM	3	2	0	2	1:23 PM	6	3	9	12
12:48 PM	6	2	0	2	1:24 PM	5	3	13	16

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
1:25 PM	0	4	1	5	2:01 PM	5	2	16	18
1:26 PM	1	4	0	4	2:02 PM	11	2	15	17
1:27 PM	6	2	2	4	2:03 PM	6	1	0	1
1:28 PM	5	2	1	3	2:04 PM	3	5	0	5
1:29 PM	13	0	0	0	2:05 PM	8	2	0	2
1:30 PM	3	1	0	1	2:06 PM	8	4	1	5
1:31 PM	2	0	1	1	2:07 PM	10	5	2	7
1:32 PM	6	2	1	3	2:08 PM	8	4	2	6
1:33 PM	9	2	13	15	2:09 PM	7	5	1	6
1:34 PM	4	7	11	18	2:10 PM	7	5	2	7
1:35 PM	4	1	0	1	2:11 PM	1	4	13	17
1:36 PM	4	2	1	3	2:12 PM	4	3	9	12
1:37 PM	4	7	0	7	2:13 PM	1	4	0	4
1:38 PM	3	3	0	3	2:14 PM	3	5	0	5
1:39 PM	3	2	3	5	2:15 PM	2	2	0	2
1:40 PM	6	1	3	4	2:16 PM	6	3	1	4
1:41 PM	3	4	0	4	2:17 PM	3	2	4	6
1:42 PM	6	2	7	9	2:18 PM	5	1	17	18
1:43 PM	7	2	3	5	2:19 PM	10	6	8	14
1:44 PM	2	0	0	0	2:20 PM	8	4	1	5
1:45 PM	4	2	0	2	2:21 PM	0	1	0	1
1:46 PM	13	3	1	4	2:22 PM	10	3	0	3
1:47 PM	8	3	4	7	2:23 PM	9	4	1	5
1:48 PM	4	4	1	5	2:24 PM	4	4	0	4
1:49 PM	1	2	3	5	2:25 PM	5	2	0	2
1:50 PM	7	4	0	4	2:26 PM	6	4	0	4
1:51 PM	9	7	15	22	2:27 PM	5	2	2	4
1:52 PM	3	5	12	17	2:28 PM	12	6	13	19
1:53 PM	9	1	2	3	2:29 PM	13	6	17	23
1:54 PM	3	1	0	1	2:30 PM	4	1	4	5
1:55 PM	5	4	0	4	2:31 PM	9	5	0	5
1:56 PM	5	5	0	5	2:32 PM	8	5	0	5
1:57 PM	4	2	1	3	2:33 PM	3	2	0	2
1:58 PM	0	4	2	6	2:34 PM	1	1	3	4
1:59 PM	1	2	0	2	2:35 PM	1	4	1	5
2:00 PM	9	1	0	1	2:36 PM	5	1	3	4

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:37 PM	4	4	3	7	3:13 PM	1	3	0	3
2:38 PM	3	4	1	5	3:14 PM	14	5	0	5
2:39 PM	10	4	20	24	3:15 PM	3	2	1	3
2:40 PM	6	2	11	13	3:16 PM	3	1	9	10
2:41 PM	1	3	0	3	3:17 PM	6	4	1	5
2:42 PM	9	5	0	5	3:18 PM	2	4	0	4
2:43 PM	1	0	2	2	3:19 PM	8	4	0	4
2:44 PM	7	7	2	9	3:20 PM	10	4	14	18
2:45 PM	7	2	1	3	3:21 PM	7	4	19	23
2:46 PM	8	5	1	6	3:22 PM	4	3	2	5
2:47 PM	3	3	2	5	3:23 PM	8	5	0	5
2:48 PM	6	4	10	14	3:24 PM	8	4	0	4
2:49 PM	6	2	6	8	3:25 PM	6	3	0	3
2:50 PM	5	1	0	1	3:26 PM	4	3	4	7
2:51 PM	10	5	0	5	3:27 PM	6	6	1	7
2:52 PM	1	1	0	1	3:28 PM	10	3	1	4
2:53 PM	3	3	7	10	3:29 PM	10	5	5	10
2:54 PM	11	7	1	8	3:30 PM	7	2	0	2
2:55 PM	6	3	2	5	3:31 PM	9	7	19	26
2:56 PM	2	4	2	6	3:32 PM	7	3	12	15
2:57 PM	12	7	13	20	3:33 PM	6	7	3	10
2:58 PM	7	1	25	26	3:34 PM	6	5	0	5
2:59 PM	8	1	8	9	3:35 PM	11	6	2	8
3:00 PM	9	3	1	4	3:36 PM	4	3	6	9
3:01 PM	6	2	0	2	3:37 PM	9	3	19	22
3:02 PM	4	1	0	1	3:38 PM	6	6	10	16
3:03 PM	1	1	0	1	3:39 PM	3	1	0	1
3:04 PM	5	6	4	10	3:40 PM	7	7	7	14
3:05 PM	10	4	5	9	3:41 PM	11	8	7	15
3:06 PM	5	5	1	6	3:42 PM	7	5	9	14
3:07 PM	7	5	1	6	3:43 PM	8	2	3	5
3:08 PM	10	7	2	9	3:44 PM	7	4	24	28
3:09 PM	5	2	11	13	3:45 PM	8	4	18	22
3:10 PM	8	7	18	25	3:46 PM	7	3	11	14
3:11 PM	12	3	5	8	3:47 PM	15	6	0	6
3:12 PM	9	3	1	4	3:48 PM	7	7	0	7

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
3:49 PM	4	0	1	1	4:25 PM	4	4	0	4
3:50 PM	1	3	1	4	4:26 PM	5	4	0	4
3:51 PM	9	5	10	15	4:27 PM	2	2	0	2
3:52 PM	7	7	7	14	4:28 PM	6	4	0	4
3:53 PM	8	4	0	4	4:29 PM	6	5	1	6
3:54 PM	12	7	0	7	4:30 PM	10	8	14	22
3:55 PM	6	4	1	5	4:31 PM	7	4	18	22
3:56 PM	7	6	3	9	4:32 PM	8	7	2	9
3:57 PM	8	2	12	14	4:33 PM	11	1	0	1
3:58 PM	8	4	11	15	4:34 PM	2	1	0	1
3:59 PM	6	4	0	4	4:35 PM	8	3	1	4
4:00 PM	3	1	0	1	4:36 PM	8	5	0	5
4:01 PM	4	6	0	6	4:37 PM	6	2	0	2
4:02 PM	3	0	1	1	4:38 PM	4	3	0	3
4:03 PM	2	3	8	11	4:39 PM	6	4	2	6
4:04 PM	10	7	10	17	4:40 PM	5	1	1	2
4:05 PM	2	5	5	10	4:41 PM	3	4	10	14
4:06 PM	13	7	3	10	4:42 PM	12	7	12	19
4:07 PM	8	6	8	14	4:43 PM	6	3	0	3
4:08 PM	11	7	18	25	4:44 PM	11	6	0	6
4:09 PM	11	2	10	12	4:45 PM	7	6	0	6
4:10 PM	5	4	3	7	4:46 PM	9	6	0	6
4:11 PM	6	2	0	2	4:47 PM	4	5	0	5
4:12 PM	2	2	6	8	4:48 PM	4	2	0	2
4:13 PM	6	10	25	35	4:49 PM	2	3	0	3
4:14 PM	10	5	11	16	4:50 PM	5	4	5	9
4:15 PM	11	3	5	8	4:51 PM	5	1	20	21
4:16 PM	5	6	0	6	4:52 PM	11	4	22	26
4:17 PM	7	2	2	4	4:53 PM	3	5	4	9
4:18 PM	5	5	3	8	4:54 PM	8	3	0	3
4:19 PM	7	4	12	16	4:55 PM	1	7	0	7
4:20 PM	12	4	17	21	4:56 PM	10	3	2	5
4:21 PM	7	5	4	9	4:57 PM	7	5	0	5
4:22 PM	6	1	4	5	4:58 PM	7	6	1	7
4:23 PM	5	4	2	6	4:59 PM	8	3	1	4
4:24 PM	11	5	1	6	5:00 PM	9	8	3	11

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
5:01 PM	9	1	10	11	5:37 PM	7	5	1	6
5:02 PM	13	5	10	15	5:38 PM	5	2	0	2
5:03 PM	6	3	1	4	5:39 PM	7	8	0	8
5:04 PM	6	11	0	11	5:40 PM	8	3	1	4
5:05 PM	5	6	0	6	5:41 PM	18	4	0	4
5:06 PM	0	0	0	0	5:42 PM	5	4	8	12
5:07 PM	0	9	0	9	5:43 PM	7	3	28	31
5:08 PM	1	9	0	9	5:44 PM	8	6	1	7
5:09 PM	7	12	0	12	5:45 PM	15	1	0	1
5:10 PM	15	5	0	5	5:46 PM	2	6	0	6
5:11 PM	7	5	0	5	5:47 PM	6	4	0	4
5:12 PM	3	6	0	6	5:48 PM	4	7	0	7
5:13 PM	7	7	5	12	5:49 PM	9	3	0	3
5:14 PM	6	6	0	6	5:50 PM	7	9	1	10
5:15 PM	9	9	0	9	5:51 PM	15	4	0	4
5:16 PM	14	6	0	6	5:52 PM	3	2	1	3
5:17 PM	10	7	1	8	5:53 PM	3	8	10	18
5:18 PM	12	6	30	36	5:54 PM	10	3	17	20
5:19 PM	8	9	11	20	5:55 PM	9	7	1	8
5:20 PM	2	2	0	2	5:56 PM	12	10	0	10
5:21 PM	2	5	0	5	5:57 PM	7	2	0	2
5:22 PM	8	4	0	4	5:58 PM	3	5	1	6
5:23 PM	6	10	0	10	5:59 PM	10	4	1	5
5:24 PM	11	3	2	5	6:00 PM	7	4	1	5
5:25 PM	1	4	0	4	6:01 PM	6	6	2	8
5:26 PM	6	9	1	10	6:02 PM	7	4	0	4
5:27 PM	7	6	0	6	6:03 PM	6	2	0	2
5:28 PM	11	8	1	9	6:04 PM	6	1	12	13
5:29 PM	10	5	8	13	6:05 PM	7	5	12	17
5:30 PM	7	7	11	18	6:06 PM	6	0	0	0
5:31 PM	9	6	10	16	6:07 PM	0	5	0	5
5:32 PM	5	5	1	6	6:08 PM	8	5	0	5
5:33 PM	2	5	0	5	6:09 PM	5	4	0	4
5:34 PM	6	3	0	3	6:10 PM	6	2	0	2
5:35 PM	5	8	0	8	6:11 PM	3	4	3	7
5:36 PM	6	7	0	7	6:12 PM	6	4	0	4

Local Time	iCone	Video		
	No. Reads	Coming	Going	Total
6:13 PM	5	5	1	6
6:14 PM	5	7	0	7
6:15 PM	4	5	0	5
6:16 PM	11	5	0	5
6:17 PM	10	5	2	7
6:18 PM	12	4	15	19
6:19 PM	10	3	13	16
6:20 PM	5	5	13	18
6:21 PM	1	3	0	3
6:22 PM	1	4	0	4
6:23 PM	5	6	0	6
6:24 PM	6	7	0	7
6:25 PM	12	5	0	5
6:26 PM	10	4	2	6
6:27 PM	8	3	0	3
6:28 PM	6	4	0	4
6:29 PM	4	7	0	7
6:30 PM	6	1	3	4
Total	1794	1050	1059	2109

Table A.22 US 50 near Newton, KS on August 27, 2014. 2nd iCone

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
9:13 AM	6	4	0	4	9:49 AM	1	2	0	2
9:14 AM	2	1	0	1	9:50 AM	6	3	0	3
9:15 AM	6	5	1	6	9:51 AM	1	1	5	6
9:16 AM	4	4	0	4	9:52 AM	13	3	12	15
9:17 AM	3	1	4	5	9:53 AM	5	0	1	1
9:18 AM	12	5	15	20	9:54 AM	0	0	0	0
9:19 AM	5	2	0	2	9:55 AM	1	2	1	3
9:20 AM	2	0	0	0	9:56 AM	8	5	0	5
9:21 AM	1	2	0	2	9:57 AM	1	0	0	0
9:22 AM	2	3	0	3	9:58 AM	2	2	0	2
9:23 AM	5	0	1	1	9:59 AM	2	1	1	2
9:24 AM	0	1	0	1	10:00 AM	5	6	0	6
9:25 AM	1	0	0	0	10:01 AM	4	4	0	4
9:26 AM	4	4	3	7	10:02 AM	5	3	8	11
9:27 AM	9	5	0	5	10:03 AM	9	1	6	7
9:28 AM	9	7	3	10	10:04 AM	4	1	3	4
9:29 AM	14	6	16	22	10:05 AM	2	2	0	2
9:30 AM	8	3	1	4	10:06 AM	4	2	0	2
9:31 AM	2	2	0	2	10:07 AM	2	1	0	1
9:32 AM	5	4	0	4	10:08 AM	1	2	1	3
9:33 AM	4	3	0	3	10:09 AM	2	2	1	3
9:34 AM	3	4	0	4	10:10 AM	6	5	0	5
9:35 AM	5	4	0	4	10:11 AM	4	0	0	0
9:36 AM	3	1	0	1	10:12 AM	0	1	0	1
9:37 AM	0	3	1	4	10:13 AM	10	2	15	17
9:38 AM	7	1	0	1	10:14 AM	11	5	7	12
9:39 AM	3	5	0	5	10:15 AM	10	6	0	6
9:40 AM	9	2	7	9	10:16 AM	2	0	0	0
9:41 AM	14	4	13	17	10:17 AM	3	3	0	3
9:42 AM	13	2	12	14	10:18 AM	1	0	0	0
9:43 AM	5	0	0	0	10:19 AM	0	0	0	0
9:44 AM	0	1	0	1	10:20 AM	1	4	1	5
9:45 AM	3	2	0	2	10:21 AM	3	1	0	1
9:46 AM	5	5	0	5	10:22 AM	6	7	8	15
9:47 AM	3	1	1	2	10:23 AM	7	2	5	7
9:48 AM	4	1	0	1	10:24 AM	4	0	1	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
10:25 AM	3	3	0	3	11:06 AM	1	2	8	10
10:26 AM	3	3	0	3	11:07 AM	5	5	0	5
10:27 AM	6	3	0	3	11:08 AM	3	1	0	1
10:28 AM	6	3	0	3	11:09 AM	13	0	1	1
10:29 AM	5	5	0	5	11:10 AM	11	1	0	1
10:30 AM	5	5	0	5	11:11 AM	5	1	0	1
10:31 AM	6	2	0	2	11:12 AM	0	3	0	3
10:32 AM	7	7	12	19	11:13 AM	0	3	0	3
10:33 AM	15	4	5	9	11:14 AM	2	9	5	14
10:34 AM	2	2	0	2	11:15 AM	4	4	10	14
10:35 AM	3	3	0	3	11:16 AM	2	2	3	5
10:36 AM	3	0	0	0	11:17 AM	2	1	0	1
10:37 AM	3	5	0	5	11:18 AM	3	0	0	0
10:38 AM	5	0	0	0	11:19 AM	9	1	0	1
10:39 AM	0	2	0	2	11:20 AM	13	1	1	2
10:40 AM	2	2	15	17	11:21 AM	1	2	0	2
10:41 AM	8	0	2	2	11:22 AM	4	1	0	1
10:42 AM	9	1	0	1	11:23 AM	10	3	0	3
10:43 AM	2	0	0	0	11:24 AM	1	1	3	4
10:44 AM	2	1	1	2	11:25 AM	2	5	13	18
10:45 AM	1	3	0	3	11:26 AM	0	0	6	6
10:46 AM	4	4	0	4	11:27 AM	5	2	0	2
10:47 AM	4	2	1	3	11:28 AM	4	5	0	5
10:48 AM	2	3	0	3	11:29 AM	6	3	0	3
10:49 AM	2	3	2	5	11:30 AM	13	2	0	2
10:50 AM	10	2	15	17	11:31 AM	1	0	0	0
10:51 AM	10	4	0	4	11:32 AM	3	1	0	1
10:52 AM	3	2	0	2	11:33 AM	1	3	0	3
10:58 AM	5	3	0	3	11:34 AM	5	4	0	4
10:59 AM	0	2	0	2	11:35 AM	7	5	8	13
11:00 AM	7	0	0	0	11:36 AM	4	0	1	1
11:01 AM	16	1	1	2	11:37 AM	2	2	0	2
11:02 AM	9	5	0	5	11:38 AM	4	1	0	1
11:03 AM	3	1	0	1	11:39 AM	1	3	1	4
11:04 AM	0	2	0	2	11:40 AM	14	4	0	4
11:05 AM	2	2	15	17	11:41 AM	3	5	0	5

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
11:42 AM	2	2	0	2	12:18 PM	5	2	17	19
11:43 AM	2	3	0	3	12:19 PM	2	0	2	2
11:44 AM	8	3	10	13	12:20 PM	2	3	0	3
11:45 AM	1	1	4	5	12:21 PM	0	4	0	4
11:46 AM	4	3	0	3	12:22 PM	10	2	0	2
11:47 AM	7	2	0	2	12:23 PM	10	4	0	4
11:48 AM	4	1	0	1	12:24 PM	10	1	0	1
11:49 AM	10	4	1	5	12:25 PM	2	2	1	3
11:50 AM	13	1	0	1	12:26 PM	4	8	0	8
11:51 AM	0	3	0	3	12:27 PM	1	3	13	16
11:52 AM	13	5	1	6	12:28 PM	3	3	7	10
11:53 AM	9	1	2	3	12:29 PM	4	1	1	2
11:54 AM	3	5	2	7	12:30 PM	2	0	0	0
11:55 AM	1	0	18	18	12:31 PM	1	2	0	2
11:56 AM	5	0	1	1	12:32 PM	3	1	0	1
11:57 AM	3	10	0	10	12:33 PM	5	1	0	1
11:58 AM	2	4	2	6	12:34 PM	9	3	1	4
11:59 AM	15	3	0	3	12:35 PM	13	2	0	2
12:00 PM	12	1	0	1	12:36 PM	7	0	0	0
12:01 PM	0	4	1	5	12:37 PM	4	4	0	4
12:02 PM	4	2	0	2	12:38 PM	4	3	0	3
12:03 PM	4	0	0	0	12:39 PM	0	4	3	7
12:04 PM	3	4	13	17	12:40 PM	6	2	22	24
12:05 PM	8	7	10	17	12:41 PM	2	2	5	7
12:06 PM	5	0	1	1	12:42 PM	5	3	0	3
12:07 PM	3	2	1	3	12:43 PM	3	4	1	5
12:08 PM	0	2	1	3	12:44 PM	8	0	0	0
12:09 PM	2	3	0	3	12:45 PM	7	5	0	5
12:10 PM	4	6	1	7	12:46 PM	3	0	1	1
12:11 PM	3	3	0	3	12:47 PM	1	4	0	4
12:12 PM	6	2	1	3	12:48 PM	6	2	0	2
12:13 PM	13	0	0	0	12:49 PM	3	1	12	13
12:14 PM	2	1	1	2	12:50 PM	5	4	7	11
12:15 PM	4	2	0	2	12:51 PM	0	2	0	2
12:16 PM	4	3	0	3	12:52 PM	1	1	0	1
12:17 PM	5	1	3	4	12:53 PM	5	6	1	7

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
12:54 PM	11	3	0	3	1:30 PM	0	2	2	4
12:55 PM	5	4	0	4	1:31 PM	0	4	0	4
12:56 PM	3	0	0	0	1:32 PM	4	1	0	1
12:57 PM	0	1	0	1	1:33 PM	5	0	0	0
12:58 PM	2	2	4	6	1:34 PM	11	1	0	1
12:59 PM	2	3	12	15	1:35 PM	0	0	0	0
1:00 PM	1	3	3	6	1:36 PM	6	0	0	0
1:01 PM	3	1	0	1	1:37 PM	5	4	0	4
1:02 PM	5	0	0	0	1:38 PM	0	0	0	0
1:03 PM	2	3	0	3	1:39 PM	4	1	5	6
1:04 PM	3	0	0	0	1:40 PM	3	1	14	15
1:05 PM	13	1	0	1	1:41 PM	4	5	0	5
1:06 PM	8	3	0	3	1:42 PM	10	2	0	2
1:07 PM	1	1	2	3	1:43 PM	9	0	0	0
1:08 PM	2	2	0	2	1:44 PM	2	6	0	6
1:09 PM	1	4	0	4	1:45 PM	4	3	0	3
1:10 PM	5	2	15	17	1:46 PM	5	3	0	3
1:11 PM	7	3	3	6	1:47 PM	5	2	15	17
1:12 PM	2	1	0	1	1:48 PM	2	4	0	4
1:13 PM	6	3	0	3	1:49 PM	1	2	0	2
1:14 PM	14	2	0	2	1:50 PM	3	3	0	3
1:15 PM	10	6	0	6	1:51 PM	10	4	0	4
1:16 PM	2	4	2	6	1:52 PM	13	1	0	1
1:17 PM	9	1	0	1	1:53 PM	9	2	1	3
1:18 PM	6	3	9	12	1:54 PM	2	1	0	1
1:19 PM	2	3	13	16	1:55 PM	7	3	0	3
1:20 PM	3	1	7	8	1:56 PM	6	7	2	9
1:21 PM	4	3	0	3	1:57 PM	4	1	10	11
1:22 PM	2	4	0	4	1:58 PM	1	3	9	12
1:23 PM	8	3	0	3	1:59 PM	7	4	0	4
1:24 PM	12	1	0	1	2:00 PM	1	3	0	3
1:25 PM	5	3	1	4	2:01 PM	7	4	1	5
1:26 PM	4	1	0	1	2:02 PM	14	3	0	3
1:27 PM	1	1	0	1	2:03 PM	4	1	0	1
1:28 PM	0	2	15	17	2:04 PM	1	3	1	4
1:29 PM	2	1	9	10	2:05 PM	4	1	0	1

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
2:06 PM	3	3	10	13	2:42 PM	4	4	1	5
2:07 PM	2	2	13	15	2:43 PM	12	0	0	0
2:08 PM	5	1	0	1	2:44 PM	11	4	1	5
2:09 PM	9	0	0	0	2:45 PM	6	3	0	3
2:10 PM	1	6	0	6	2:46 PM	5	3	14	17
2:11 PM	4	3	0	3	2:47 PM	1	3	1	4
2:12 PM	15	0	1	1	2:48 PM	6	3	1	4
2:13 PM	11	5	0	5	2:49 PM	7	2	0	2
2:14 PM	4	2	1	3	2:50 PM	8	5	0	5
2:15 PM	5	1	1	2	2:51 PM	7	5	0	5
2:16 PM	3	2	6	8	2:52 PM	6	5	3	8
2:17 PM	4	2	20	22	2:53 PM	13	6	1	7
2:18 PM	2	2	8	10	2:54 PM	7	4	1	5
2:19 PM	3	4	2	6	2:55 PM	0	5	14	19
2:20 PM	7	5	0	5	2:56 PM	11	4	4	8
2:21 PM	2	3	0	3	2:57 PM	4	1	0	1
2:22 PM	3	5	0	5	2:58 PM	5	3	0	3
2:23 PM	7	4	0	4	2:59 PM	0	3	0	3
2:24 PM	15	4	1	5	3:00 PM	4	2	1	3
2:25 PM	3	2	0	2	3:01 PM	3	0	0	0
2:26 PM	4	2	0	2	3:02 PM	2	3	0	3
2:27 PM	1	3	6	9	3:03 PM	2	3	1	4
2:28 PM	9	1	14	15	3:04 PM	11	1	1	2
2:29 PM	10	5	1	6	3:05 PM	14	2	0	2
2:30 PM	3	3	0	3	3:06 PM	7	2	16	18
2:31 PM	6	7	1	8	3:07 PM	4	5	10	15
2:32 PM	0	1	3	4	3:08 PM	9	3	0	3
2:33 PM	1	4	0	4	3:09 PM	6	7	0	7
2:34 PM	13	1	0	1	3:10 PM	8	5	0	5
2:35 PM	10	6	20	26	3:11 PM	4	5	1	6
2:36 PM	0	3	3	6	3:12 PM	1	5	1	6
2:37 PM	2	0	0	0	3:13 PM	6	0	1	1
2:38 PM	1	0	0	0	3:14 PM	7	2	0	2
2:39 PM	6	1	0	1	3:15 PM	13	4	0	4
2:40 PM	4	2	0	2	3:16 PM	11	4	5	9
2:41 PM	2	4	1	5	3:17 PM	10	2	12	14

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
3:18 PM	3	1	11	12	3:54 PM	1	1	7	8
3:19 PM	1	6	5	11	3:55 PM	2	4	0	4
3:20 PM	3	2	0	2	3:56 PM	3	1	1	2
3:21 PM	2	1	0	1	3:57 PM	7	1	0	1
3:22 PM	5	2	1	3	3:58 PM	2	2	0	2
3:23 PM	2	3	0	3	3:59 PM	1	6	0	6
3:24 PM	1	1	0	1	4:00 PM	1	1	0	1
3:25 PM	2	1	0	1	4:01 PM	7	1	0	1
3:26 PM	13	1	0	1	4:02 PM	15	1	0	1
3:27 PM	13	3	2	5	4:03 PM	12	1	0	1
3:28 PM	8	5	13	18	4:04 PM	3	6	13	19
3:29 PM	6	3	13	16	4:05 PM	0	10	12	22
3:30 PM	2	2	2	4	4:06 PM	2	8	2	10
3:31 PM	1	3	1	4	4:07 PM	1	2	0	2
3:32 PM	5	2	0	2	4:08 PM	5	0	0	0
3:33 PM	4	0	0	0	4:09 PM	9	1	0	1
3:34 PM	7	5	1	6	4:10 PM	3	2	0	2
3:35 PM	0	4	0	4	4:11 PM	2	8	0	8
3:36 PM	4	3	0	3	4:12 PM	1	4	0	4
3:37 PM	12	1	0	1	4:13 PM	11	0	0	0
3:38 PM	10	6	1	7	4:14 PM	14	2	0	2
3:39 PM	7	7	9	16	4:15 PM	10	4	0	4
3:40 PM	11	3	5	8	4:16 PM	1	4	14	18
3:41 PM	7	4	13	17	4:17 PM	2	7	13	20
3:42 PM	5	2	7	9	4:18 PM	1	1	1	2
3:43 PM	4	3	0	3	4:19 PM	7	1	0	1
3:44 PM	1	7	0	7	4:20 PM	2	0	0	0
3:45 PM	1	0	0	0	4:21 PM	4	3	0	3
3:46 PM	3	2	0	2	4:22 PM	3	4	1	5
3:47 PM	6	1	0	1	4:23 PM	2	2	1	3
3:48 PM	0	3	0	3	4:24 PM	8	3	0	3
3:49 PM	1	3	0	3	4:25 PM	16	1	1	2
3:50 PM	10	0	0	0	4:26 PM	12	2	0	2
3:51 PM	11	3	4	7	4:27 PM	7	3	11	14
3:52 PM	9	5	13	18	4:28 PM	3	5	19	24
3:53 PM	6	5	11	16	4:29 PM	3	6	4	10

Local Time	iCone	Video			Local Time	iCone	Video		
	No. Reads	Coming	Going	Total		No. Reads	Coming	Going	Total
4:30 PM	3	5	0	5	5:06 PM	2	0	0	0
4:31 PM	3	3	0	3	5:07 PM	2	1	1	2
4:32 PM	1	1	0	1	5:08 PM	4	1	0	1
4:33 PM	4	2	0	2	5:09 PM	2	0	1	1
4:34 PM	10	2	0	2	5:10 PM	7	4	0	4
4:35 PM	9	2	0	2	5:11 PM	11	1	0	1
4:36 PM	10	8	1	9	5:12 PM	12	3	1	4
4:37 PM	13	1	3	4	5:13 PM	10	1	14	15
4:38 PM	2	0	14	14	5:14 PM	7	2	10	12
4:39 PM	0	0	11	11	5:15 PM	7	3	10	13
4:40 PM	3	1	5	6	5:16 PM	7	5	9	14
4:41 PM	13	2	0	2	5:17 PM	3	6	0	6
4:42 PM	9	0	0	0	5:18 PM	3	4	0	4
4:43 PM	1	9	0	9	5:19 PM	7	5	0	5
4:44 PM	3	11	0	11	5:20 PM	3	3	0	3
4:45 PM	5	1	0	1	5:21 PM	2	2	2	4
4:46 PM	11	0	0	0	5:22 PM	8	3	0	3
4:47 PM	6	5	0	5	5:23 PM	13	1	1	2
4:48 PM	3	3	11	14	5:24 PM	15	3	0	3
4:49 PM	2	1	7	8	5:25 PM	10	3	18	21
4:50 PM	3	2	4	6	5:26 PM	4	0	15	15
4:51 PM	3	2	0	2	5:27 PM	6	3	6	9
4:52 PM	2	1	0	1	5:28 PM	5	4	9	13
4:53 PM	0	2	0	2	5:29 PM	4	3	1	4
4:54 PM	11	3	0	3	5:30 PM	3	4	1	5
4:55 PM	6	0	0	0	5:31 PM	4	3	0	3
4:56 PM	2	3	0	3	5:32 PM	5	4	0	4
4:57 PM	11	6	0	6	5:33 PM	4	2	0	2
4:58 PM	10	2	0	2	5:34 PM	5	2	3	5
4:59 PM	1	2	3	5	5:35 PM	13	4	0	4
5:00 PM	2	2	16	18	5:36 PM	12	3	0	3
5:01 PM	2	2	0	2	5:37 PM	9	4	9	13
5:02 PM	2	1	0	1	5:38 PM	4	4	17	21
5:03 PM	4	3	0	3	5:39 PM	4	3	8	11
5:04 PM	2	0	0	0	5:40 PM	5	1	4	5
5:05 PM	0	4	0	4	5:41 PM	2	2	3	5

Local Time	iCone	Video		
	No. Reads	Coming	Going	Total
5:42 PM	1	5	0	5
5:43 PM	7	2	0	2
5:44 PM	2	0	0	0
5:45 PM	2	5	1	6
5:46 PM	6	2	0	2
5:47 PM	7	1	0	1
5:48 PM	13	0	2	2
5:49 PM	8	5	0	5
5:50 PM	5	6	13	19
5:51 PM	2	2	14	16
5:52 PM	0	0	6	6
5:53 PM	4	1	1	2
5:54 PM	5	0	0	0
5:55 PM	3	4	0	4
5:56 PM	2	3	0	3
5:57 PM	3	2	0	2
5:58 PM	7	2	0	2
5:59 PM	12	3	0	3
6:00 PM	8	1	4	5
Total	1339	699	656	1355

11.2 Appendix B. (Multi-Devices Data Collection)

Table B.1 US 24/40 Lawrence, KS on February 24, 2015. Samples of Upstream Data (PRTs Only).

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/24/2015 1:11:18 PM	1	61	Day	2/24/2015 1:22:57 PM	1	54	Day
2/24/2015 1:12:03 PM	1	62	Day	2/24/2015 1:23:02 PM	1	53	Day
2/24/2015 1:12:04 PM	1	58	Day	2/24/2015 1:23:22 PM	1	62	Day
2/24/2015 1:13:36 PM	1	45	Day	2/24/2015 1:23:27 PM	1	51	Day
2/24/2015 1:14:12 PM	1	55	Day	2/24/2015 1:23:57 PM	1	46	Day
2/24/2015 1:14:19 PM	1	51	Day	2/24/2015 1:24:46 PM	1	59	Day
2/24/2015 1:14:20 PM	1	53	Day	2/24/2015 1:25:01 PM	1	57	Day
2/24/2015 1:14:36 PM	1	49	Day	2/24/2015 1:25:03 PM	1	55	Day
2/24/2015 1:14:48 PM	1	54	Day	2/24/2015 1:25:38 PM	1	58	Day
2/24/2015 1:15:03 PM	1	55	Day	2/24/2015 1:25:48 PM	1	54	Day
2/24/2015 1:15:07 PM	1	58	Day	2/24/2015 1:26:08 PM	1	65	Day
2/24/2015 1:16:19 PM	1	57	Day	2/24/2015 1:26:12 PM	1	59	Day
2/24/2015 1:16:21 PM	1	54	Day	2/24/2015 1:26:14 PM	1	59	Day
2/24/2015 1:17:22 PM	1	51	Day	2/24/2015 1:26:57 PM	1	62	Day
2/24/2015 1:17:22 PM	1	51	Day	2/24/2015 1:27:02 PM	1	66	Day
2/24/2015 1:17:26 PM	1	52	Day	2/24/2015 1:27:06 PM	1	60	Day
2/24/2015 1:17:53 PM	1	54	Day	2/24/2015 1:27:08 PM	1	61	Day
2/24/2015 1:17:57 PM	1	57	Day	2/24/2015 1:27:59 PM	1	63	Day
2/24/2015 1:18:08 PM	1	50	Day	2/24/2015 1:28:47 PM	1	61	Day
2/24/2015 1:18:16 PM	1	60	Day	2/24/2015 1:29:10 PM	1	61	Day
2/24/2015 1:18:18 PM	1	62	Day	2/24/2015 1:29:12 PM	1	59	Day
2/24/2015 1:18:36 PM	1	59	Day	2/24/2015 1:29:32 PM	1	48	Day
2/24/2015 1:18:49 PM	1	45	Day	2/24/2015 1:29:33 PM	1	50	Day
2/24/2015 1:18:57 PM	1	67	Day	2/24/2015 1:30:03 PM	1	55	Day
2/24/2015 1:19:14 PM	1	53	Day	2/24/2015 1:30:06 PM	1	56	Day
2/24/2015 1:19:17 PM	1	51	Day	2/24/2015 1:30:26 PM	1	52	Day
2/24/2015 1:20:07 PM	1	62	Day	2/24/2015 1:31:11 PM	1	54	Day
2/24/2015 1:20:14 PM	1	62	Day	2/24/2015 1:31:34 PM	1	42	Day
2/24/2015 1:20:58 PM	1	56	Day	2/24/2015 1:31:35 PM	1	50	Day
2/24/2015 1:21:30 PM	1	53	Day	2/24/2015 1:31:49 PM	1	54	Day
2/24/2015 1:21:42 PM	1	53	Day	2/24/2015 1:32:00 PM	1	43	Day
2/24/2015 1:21:56 PM	1	55	Day	2/24/2015 1:32:00 PM	1	43	Day
2/24/2015 1:22:15 PM	1	69	Day	2/24/2015 1:32:01 PM	1	44	Day
2/24/2015 1:22:17 PM	1	63	Day	2/24/2015 1:32:11 PM	1	60	Day
2/24/2015 1:22:26 PM	1	51	Day	2/24/2015 1:32:43 PM	1	67	Day
2/24/2015 1:22:42 PM	1	60	Day	2/24/2015 1:33:46 PM	1	52	Day
2/24/2015 1:22:43 PM	1	62	Day	2/24/2015 1:34:10 PM	1	57	Day

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/24/2015 5:38:04 PM	1	61	Sunset	2/24/2015 5:46:42 PM	1	54	Sunset
2/24/2015 5:38:12 PM	1	48	Sunset	2/24/2015 5:46:45 PM	1	53	Sunset
2/24/2015 5:38:40 PM	1	60	Sunset	2/24/2015 5:46:46 PM	1	50	Sunset
2/24/2015 5:38:58 PM	1	59	Sunset	2/24/2015 5:46:49 PM	1	53	Sunset
2/24/2015 5:39:00 PM	1	60	Sunset	2/24/2015 5:46:54 PM	1	40	Sunset
2/24/2015 5:39:02 PM	1	56	Sunset	2/24/2015 5:46:55 PM	1	42	Sunset
2/24/2015 5:39:05 PM	1	60	Sunset	2/24/2015 5:46:59 PM	1	45	Sunset
2/24/2015 5:39:08 PM	1	63	Sunset	2/24/2015 5:47:06 PM	1	47	Sunset
2/24/2015 5:39:09 PM	1	61	Sunset	2/24/2015 5:47:16 PM	1	61	Sunset
2/24/2015 5:39:13 PM	1	59	Sunset	2/24/2015 5:47:20 PM	1	61	Sunset
2/24/2015 5:39:15 PM	1	56	Sunset	2/24/2015 5:47:23 PM	1	58	Sunset
2/24/2015 5:39:56 PM	1	60	Sunset	2/24/2015 5:47:30 PM	1	56	Sunset
2/24/2015 5:40:20 PM	1	61	Sunset	2/24/2015 5:47:42 PM	1	53	Sunset
2/24/2015 5:41:30 PM	1	64	Sunset	2/24/2015 5:47:50 PM	1	63	Sunset
2/24/2015 5:41:32 PM	1	61	Sunset	2/24/2015 5:48:16 PM	1	62	Sunset
2/24/2015 5:41:39 PM	1	54	Sunset	2/24/2015 5:48:17 PM	1	59	Sunset
2/24/2015 5:42:16 PM	1	59	Sunset	2/24/2015 5:48:26 PM	1	54	Sunset
2/24/2015 5:42:21 PM	1	54	Sunset	2/24/2015 5:48:31 PM	1	52	Sunset
2/24/2015 5:42:22 PM	1	59	Sunset	2/24/2015 5:48:33 PM	1	55	Sunset
2/24/2015 5:42:34 PM	1	60	Sunset	2/24/2015 5:48:35 PM	1	60	Sunset
2/24/2015 5:42:37 PM	1	61	Sunset	2/24/2015 5:48:37 PM	1	64	Sunset
2/24/2015 5:42:39 PM	1	54	Sunset	2/24/2015 5:49:10 PM	1	69	Sunset
2/24/2015 5:42:51 PM	1	54	Sunset	2/24/2015 5:49:13 PM	1	66	Sunset
2/24/2015 5:43:21 PM	1	63	Sunset	2/24/2015 5:49:34 PM	1	59	Sunset
2/24/2015 5:43:29 PM	1	56	Sunset	2/24/2015 5:50:04 PM	1	54	Sunset
2/24/2015 5:43:36 PM	1	50	Sunset	2/24/2015 5:50:06 PM	1	51	Sunset
2/24/2015 5:43:44 PM	1	51	Sunset	2/24/2015 5:50:09 PM	1	49	Sunset
2/24/2015 5:43:46 PM	1	51	Sunset	2/24/2015 5:50:19 PM	1	59	Sunset
2/24/2015 5:43:46 PM	1	51	Sunset	2/24/2015 5:50:54 PM	1	62	Sunset
2/24/2015 5:44:01 PM	1	57	Sunset	2/24/2015 5:51:08 PM	1	56	Sunset
2/24/2015 5:44:05 PM	1	60	Sunset	2/24/2015 5:51:12 PM	1	62	Sunset
2/24/2015 5:44:13 PM	1	48	Sunset	2/24/2015 5:51:17 PM	1	58	Sunset
2/24/2015 5:44:21 PM	1	62	Sunset	2/24/2015 5:51:27 PM	1	58	Sunset
2/24/2015 5:44:59 PM	1	62	Sunset	2/24/2015 5:51:28 PM	1	57	Sunset
2/24/2015 5:45:02 PM	1	65	Sunset	2/24/2015 5:51:37 PM	1	52	Sunset
2/24/2015 5:45:08 PM	1	54	Sunset	2/24/2015 5:53:13 PM	1	53	Sunset
2/24/2015 5:46:34 PM	1	49	Sunset	2/24/2015 5:53:15 PM	1	54	Sunset

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/24/2015 7:43:02 PM	1	54	Night	2/24/2015 8:00:56 PM	1	63	Night
2/24/2015 7:44:22 PM	1	55	Night	2/24/2015 8:01:21 PM	1	57	Night
2/24/2015 7:44:48 PM	1	59	Night	2/24/2015 8:01:22 PM	1	55	Night
2/24/2015 7:45:12 PM	1	64	Night	2/24/2015 8:01:37 PM	1	68	Night
2/24/2015 7:45:40 PM	1	56	Night	2/24/2015 8:01:45 PM	1	63	Night
2/24/2015 7:46:26 PM	1	60	Night	2/24/2015 8:02:08 PM	1	65	Night
2/24/2015 7:46:49 PM	1	55	Night	2/24/2015 8:04:16 PM	1	60	Night
2/24/2015 7:47:09 PM	1	69	Night	2/24/2015 8:05:12 PM	1	54	Night
2/24/2015 7:47:52 PM	1	53	Night	2/24/2015 8:05:37 PM	1	65	Night
2/24/2015 7:47:54 PM	1	52	Night	2/24/2015 8:05:44 PM	1	62	Night
2/24/2015 7:48:15 PM	1	59	Night	2/24/2015 8:06:38 PM	1	60	Night
2/24/2015 7:48:18 PM	1	60	Night	2/24/2015 8:06:52 PM	1	55	Night
2/24/2015 7:48:26 PM	1	58	Night	2/24/2015 8:07:00 PM	1	54	Night
2/24/2015 7:48:33 PM	1	55	Night	2/24/2015 8:08:06 PM	1	59	Night
2/24/2015 7:49:40 PM	1	61	Night	2/24/2015 8:08:12 PM	1	58	Night
2/24/2015 7:49:41 PM	1	62	Night	2/24/2015 8:08:19 PM	1	62	Night
2/24/2015 7:50:07 PM	1	61	Night	2/24/2015 8:08:25 PM	1	60	Night
2/24/2015 7:51:21 PM	1	59	Night	2/24/2015 8:08:27 PM	1	58	Night
2/24/2015 7:53:11 PM	1	61	Night	2/24/2015 8:08:28 PM	1	58	Night
2/24/2015 7:53:45 PM	1	60	Night	2/24/2015 8:08:39 PM	1	55	Night
2/24/2015 7:54:20 PM	1	47	Night	2/24/2015 8:08:50 PM	1	54	Night
2/24/2015 7:54:21 PM	1	48	Night	2/24/2015 8:08:53 PM	1	55	Night
2/24/2015 7:54:50 PM	1	65	Night	2/24/2015 8:09:09 PM	1	63	Night
2/24/2015 7:55:08 PM	1	59	Night	2/24/2015 8:09:15 PM	1	61	Night
2/24/2015 7:55:36 PM	1	61	Night	2/24/2015 8:11:03 PM	1	53	Night
2/24/2015 7:55:50 PM	1	64	Night	2/24/2015 8:11:05 PM	1	52	Night
2/24/2015 7:56:28 PM	1	58	Night	2/24/2015 8:11:08 PM	1	53	Night
2/24/2015 7:57:11 PM	1	51	Night	2/24/2015 8:12:08 PM	1	56	Night
2/24/2015 7:57:16 PM	1	52	Night	2/24/2015 8:13:22 PM	1	54	Night
2/24/2015 7:58:20 PM	1	56	Night	2/24/2015 8:13:32 PM	1	46	Night
2/24/2015 7:58:41 PM	1	60	Night	2/24/2015 8:14:01 PM	1	52	Night
2/24/2015 7:59:12 PM	1	51	Night	2/24/2015 8:14:15 PM	1	55	Night
2/24/2015 8:00:10 PM	1	61	Night	2/24/2015 8:15:05 PM	1	60	Night
2/24/2015 8:00:15 PM	1	57	Night	2/24/2015 8:17:13 PM	1	63	Night
2/24/2015 8:00:35 PM	1	27	Night	2/24/2015 8:17:18 PM	1	63	Night
2/24/2015 8:00:42 PM	1	51	Night	2/24/2015 8:17:53 PM	1	55	Night
2/24/2015 8:00:51 PM	1	60	Night	2/24/2015 8:18:14 PM	1	59	Night

Table B.2 US 24/40 Lawrence, KS on February 25, 2015. Samples of Upstream Data (PRTs Only).

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/25/2015 6:29:22 AM	1	58	Sunrise	2/25/2015 6:38:41 AM	1	58	Sunrise
2/25/2015 6:30:17 AM	1	65	Sunrise	2/25/2015 6:38:42 AM	1	54	Sunrise
2/25/2015 6:30:19 AM	1	64	Sunrise	2/25/2015 6:39:19 AM	1	68	Sunrise
2/25/2015 6:30:57 AM	1	58	Sunrise	2/25/2015 6:39:28 AM	1	60	Sunrise
2/25/2015 6:30:58 AM	1	68	Sunrise	2/25/2015 6:40:09 AM	1	51	Sunrise
2/25/2015 6:31:05 AM	1	61	Sunrise	2/25/2015 6:41:01 AM	1	64	Sunrise
2/25/2015 6:31:31 AM	1	49	Sunrise	2/25/2015 6:41:12 AM	1	64	Sunrise
2/25/2015 6:31:46 AM	1	57	Sunrise	2/25/2015 6:41:15 AM	1	60	Sunrise
2/25/2015 6:32:08 AM	1	70	Sunrise	2/25/2015 6:41:24 AM	1	58	Sunrise
2/25/2015 6:32:20 AM	1	60	Sunrise	2/25/2015 6:41:38 AM	1	56	Sunrise
2/25/2015 6:32:22 AM	1	65	Sunrise	2/25/2015 6:42:02 AM	1	55	Sunrise
2/25/2015 6:32:23 AM	1	65	Sunrise	2/25/2015 6:42:03 AM	1	54	Sunrise
2/25/2015 6:32:50 AM	1	65	Sunrise	2/25/2015 6:42:05 AM	1	56	Sunrise
2/25/2015 6:33:38 AM	1	61	Sunrise	2/25/2015 6:43:28 AM	1	67	Sunrise
2/25/2015 6:33:51 AM	1	60	Sunrise	2/25/2015 6:44:12 AM	1	66	Sunrise
2/25/2015 6:33:56 AM	1	64	Sunrise	2/25/2015 6:44:15 AM	1	71	Sunrise
2/25/2015 6:34:24 AM	1	57	Sunrise	2/25/2015 6:44:26 AM	1	57	Sunrise
2/25/2015 6:34:27 AM	1	58	Sunrise	2/25/2015 6:44:47 AM	1	51	Sunrise
2/25/2015 6:34:39 AM	1	57	Sunrise	2/25/2015 6:45:00 AM	1	50	Sunrise
2/25/2015 6:34:41 AM	1	56	Sunrise	2/25/2015 6:45:01 AM	1	51	Sunrise
2/25/2015 6:34:43 AM	1	73	Sunrise	2/25/2015 6:45:04 AM	1	49	Sunrise
2/25/2015 6:34:51 AM	1	70	Sunrise	2/25/2015 6:45:39 AM	1	50	Sunrise
2/25/2015 6:34:54 AM	1	69	Sunrise	2/25/2015 6:45:43 AM	1	53	Sunrise
2/25/2015 6:34:58 AM	1	66	Sunrise	2/25/2015 6:45:46 AM	1	59	Sunrise
2/25/2015 6:35:16 AM	1	55	Sunrise	2/25/2015 6:45:48 AM	1	60	Sunrise
2/25/2015 6:36:02 AM	1	59	Sunrise	2/25/2015 6:46:36 AM	1	55	Sunrise
2/25/2015 6:36:03 AM	1	61	Sunrise	2/25/2015 6:47:00 AM	1	56	Sunrise
2/25/2015 6:36:05 AM	1	60	Sunrise	2/25/2015 6:47:09 AM	1	54	Sunrise
2/25/2015 6:36:18 AM	1	60	Sunrise	2/25/2015 6:47:25 AM	1	62	Sunrise
2/25/2015 6:36:54 AM	1	61	Sunrise	2/25/2015 6:48:02 AM	1	46	Sunrise
2/25/2015 6:37:16 AM	1	62	Sunrise	2/25/2015 6:48:14 AM	1	62	Sunrise
2/25/2015 6:37:22 AM	1	61	Sunrise	2/25/2015 6:48:19 AM	1	61	Sunrise
2/25/2015 6:37:44 AM	1	59	Sunrise	2/25/2015 6:48:29 AM	1	58	Sunrise
2/25/2015 6:37:55 AM	1	58	Sunrise	2/25/2015 6:48:34 AM	1	58	Sunrise
2/25/2015 6:38:02 AM	1	63	Sunrise	2/25/2015 6:48:37 AM	1	58	Sunrise
2/25/2015 6:38:20 AM	1	58	Sunrise	2/25/2015 6:48:42 AM	1	56	Sunrise
2/25/2015 6:38:27 AM	1	61	Sunrise	2/25/2015 6:49:00 AM	1	51	Sunrise

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/25/2015 7:42:14 AM	1	59	Day	2/25/2015 7:50:55 AM	1	55	Day
2/25/2015 7:42:19 AM	1	61	Day	2/25/2015 7:51:07 AM	1	59	Day
2/25/2015 7:42:30 AM	1	71	Day	2/25/2015 7:51:09 AM	1	59	Day
2/25/2015 7:42:49 AM	1	60	Day	2/25/2015 7:51:40 AM	1	58	Day
2/25/2015 7:42:51 AM	1	58	Day	2/25/2015 7:51:46 AM	1	61	Day
2/25/2015 7:42:54 AM	1	60	Day	2/25/2015 7:51:56 AM	1	57	Day
2/25/2015 7:42:56 AM	1	58	Day	2/25/2015 7:52:36 AM	1	55	Day
2/25/2015 7:42:59 AM	1	54	Day	2/25/2015 7:53:50 AM	1	70	Day
2/25/2015 7:43:01 AM	1	54	Day	2/25/2015 7:54:04 AM	1	57	Day
2/25/2015 7:43:02 AM	1	55	Day	2/25/2015 7:54:11 AM	1	53	Day
2/25/2015 7:43:08 AM	1	57	Day	2/25/2015 7:54:15 AM	1	61	Day
2/25/2015 7:43:30 AM	1	63	Day	2/25/2015 7:54:22 AM	1	68	Day
2/25/2015 7:43:39 AM	1	58	Day	2/25/2015 7:54:33 AM	1	51	Day
2/25/2015 7:43:44 AM	1	54	Day	2/25/2015 7:54:34 AM	1	52	Day
2/25/2015 7:43:45 AM	1	56	Day	2/25/2015 7:54:44 AM	1	61	Day
2/25/2015 7:43:47 AM	1	54	Day	2/25/2015 7:54:49 AM	1	60	Day
2/25/2015 7:43:48 AM	1	55	Day	2/25/2015 7:55:07 AM	1	60	Day
2/25/2015 7:43:59 AM	1	51	Day	2/25/2015 7:56:04 AM	1	58	Day
2/25/2015 7:44:22 AM	1	57	Day	2/25/2015 7:56:19 AM	1	54	Day
2/25/2015 7:44:23 AM	1	59	Day	2/25/2015 7:56:39 AM	1	52	Day
2/25/2015 7:44:32 AM	1	57	Day	2/25/2015 7:57:13 AM	1	64	Day
2/25/2015 7:44:36 AM	1	54	Day	2/25/2015 7:57:20 AM	1	65	Day
2/25/2015 7:44:51 AM	1	59	Day	2/25/2015 7:57:40 AM	1	59	Day
2/25/2015 7:45:08 AM	1	47	Day	2/25/2015 7:58:06 AM	1	56	Day
2/25/2015 7:45:10 AM	1	47	Day	2/25/2015 7:58:08 AM	1	55	Day
2/25/2015 7:45:30 AM	1	57	Day	2/25/2015 7:58:49 AM	1	51	Day
2/25/2015 7:46:20 AM	1	55	Day	2/25/2015 7:58:52 AM	1	57	Day
2/25/2015 7:46:31 AM	1	67	Day	2/25/2015 7:58:54 AM	1	53	Day
2/25/2015 7:47:20 AM	1	57	Day	2/25/2015 7:58:59 AM	1	57	Day
2/25/2015 7:47:23 AM	1	60	Day	2/25/2015 7:59:05 AM	1	46	Day
2/25/2015 7:48:26 AM	1	52	Day	2/25/2015 7:59:26 AM	1	67	Day
2/25/2015 7:48:43 AM	1	60	Day	2/25/2015 8:00:22 AM	1	55	Day
2/25/2015 7:49:02 AM	1	55	Day	2/25/2015 8:00:45 AM	1	61	Day
2/25/2015 7:50:22 AM	1	62	Day	2/25/2015 8:00:50 AM	1	61	Day
2/25/2015 7:50:36 AM	1	53	Day	2/25/2015 8:00:52 AM	1	62	Day
2/25/2015 7:50:38 AM	1	59	Day	2/25/2015 8:00:53 AM	1	63	Day
2/25/2015 7:50:48 AM	1	66	Day	2/25/2015 8:00:57 AM	1	62	Day

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/25/2015 5:50:24 PM	1	59	Sunset	2/25/2015 5:58:53 PM	1	63	Sunset
2/25/2015 5:50:56 PM	1	60	Sunset	2/25/2015 5:59:02 PM	1	54	Sunset
2/25/2015 5:51:02 PM	1	58	Sunset	2/25/2015 5:59:07 PM	1	53	Sunset
2/25/2015 5:51:05 PM	1	56	Sunset	2/25/2015 5:59:08 PM	1	52	Sunset
2/25/2015 5:51:32 PM	1	56	Sunset	2/25/2015 5:59:09 PM	1	56	Sunset
2/25/2015 5:51:51 PM	1	65	Sunset	2/25/2015 5:59:12 PM	1	54	Sunset
2/25/2015 5:51:53 PM	1	63	Sunset	2/25/2015 5:59:45 PM	1	62	Sunset
2/25/2015 5:52:34 PM	1	52	Sunset	2/25/2015 5:59:47 PM	1	60	Sunset
2/25/2015 5:52:38 PM	1	60	Sunset	2/25/2015 6:00:23 PM	1	65	Sunset
2/25/2015 5:52:51 PM	1	63	Sunset	2/25/2015 6:00:35 PM	1	63	Sunset
2/25/2015 5:52:57 PM	1	60	Sunset	2/25/2015 6:00:52 PM	1	65	Sunset
2/25/2015 5:53:03 PM	1	55	Sunset	2/25/2015 6:00:56 PM	1	67	Sunset
2/25/2015 5:53:19 PM	1	55	Sunset	2/25/2015 6:01:04 PM	1	55	Sunset
2/25/2015 5:53:21 PM	1	48	Sunset	2/25/2015 6:01:17 PM	1	69	Sunset
2/25/2015 5:53:30 PM	1	55	Sunset	2/25/2015 6:01:39 PM	1	55	Sunset
2/25/2015 5:53:31 PM	1	55	Sunset	2/25/2015 6:01:44 PM	1	53	Sunset
2/25/2015 5:54:27 PM	1	59	Sunset	2/25/2015 6:02:13 PM	1	64	Sunset
2/25/2015 5:54:53 PM	1	56	Sunset	2/25/2015 6:02:18 PM	1	62	Sunset
2/25/2015 5:54:56 PM	1	55	Sunset	2/25/2015 6:02:24 PM	1	54	Sunset
2/25/2015 5:55:02 PM	1	47	Sunset	2/25/2015 6:02:57 PM	1	62	Sunset
2/25/2015 5:55:07 PM	1	55	Sunset	2/25/2015 6:03:54 PM	1	70	Sunset
2/25/2015 5:55:18 PM	1	64	Sunset	2/25/2015 6:03:58 PM	1	70	Sunset
2/25/2015 5:55:27 PM	1	55	Sunset	2/25/2015 6:04:04 PM	1	61	Sunset
2/25/2015 5:56:04 PM	1	57	Sunset	2/25/2015 6:04:33 PM	1	63	Sunset
2/25/2015 5:56:08 PM	1	58	Sunset	2/25/2015 6:04:34 PM	1	63	Sunset
2/25/2015 5:56:12 PM	1	56	Sunset	2/25/2015 6:04:44 PM	1	59	Sunset
2/25/2015 5:56:23 PM	1	54	Sunset	2/25/2015 6:04:56 PM	1	55	Sunset
2/25/2015 5:56:29 PM	1	49	Sunset	2/25/2015 6:04:57 PM	1	55	Sunset
2/25/2015 5:56:30 PM	1	48	Sunset	2/25/2015 6:05:00 PM	1	53	Sunset
2/25/2015 5:56:32 PM	1	49	Sunset	2/25/2015 6:05:06 PM	1	60	Sunset
2/25/2015 5:56:57 PM	1	56	Sunset	2/25/2015 6:05:26 PM	1	62	Sunset
2/25/2015 5:57:16 PM	1	51	Sunset	2/25/2015 6:05:29 PM	1	56	Sunset
2/25/2015 5:57:19 PM	1	49	Sunset	2/25/2015 6:05:38 PM	1	60	Sunset
2/25/2015 5:57:21 PM	1	51	Sunset	2/25/2015 6:06:00 PM	1	55	Sunset
2/25/2015 5:57:22 PM	1	50	Sunset	2/25/2015 6:06:02 PM	1	62	Sunset
2/25/2015 5:57:41 PM	1	59	Sunset	2/25/2015 6:06:46 PM	1	60	Sunset
2/25/2015 5:58:43 PM	1	56	Sunset	2/25/2015 6:06:50 PM	1	58	Sunset

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/25/2015 4:46:34 AM	1	57	Night	2/25/2015 5:44:00 AM	1	61	Night
2/25/2015 4:50:33 AM	1	56	Night	2/25/2015 5:44:05 AM	1	65	Night
2/25/2015 4:52:49 AM	1	58	Night	2/25/2015 5:44:16 AM	1	64	Night
2/25/2015 4:57:40 AM	1	62	Night	2/25/2015 5:46:22 AM	1	62	Night
2/25/2015 5:02:41 AM	1	60	Night	2/25/2015 5:46:24 AM	1	60	Night
2/25/2015 5:04:33 AM	1	72	Night	2/25/2015 5:46:31 AM	1	61	Night
2/25/2015 5:06:40 AM	1	59	Night	2/25/2015 5:46:36 AM	1	58	Night
2/25/2015 5:07:03 AM	1	53	Night	2/25/2015 5:47:36 AM	1	60	Night
2/25/2015 5:08:11 AM	1	65	Night	2/25/2015 5:47:49 AM	1	63	Night
2/25/2015 5:13:44 AM	1	68	Night	2/25/2015 5:48:45 AM	1	62	Night
2/25/2015 5:14:23 AM	1	63	Night	2/25/2015 5:49:29 AM	1	58	Night
2/25/2015 5:15:27 AM	1	71	Night	2/25/2015 5:50:27 AM	1	56	Night
2/25/2015 5:17:47 AM	1	65	Night	2/25/2015 5:50:42 AM	1	50	Night
2/25/2015 5:18:12 AM	1	67	Night	2/25/2015 5:51:21 AM	1	59	Night
2/25/2015 5:20:03 AM	1	59	Night	2/25/2015 5:52:09 AM	1	57	Night
2/25/2015 5:21:14 AM	1	64	Night	2/25/2015 5:52:20 AM	1	62	Night
2/25/2015 5:22:34 AM	1	59	Night	2/25/2015 5:53:19 AM	1	60	Night
2/25/2015 5:22:52 AM	1	50	Night	2/25/2015 5:55:13 AM	1	59	Night
2/25/2015 5:23:02 AM	1	56	Night	2/25/2015 5:55:15 AM	1	58	Night
2/25/2015 5:24:19 AM	1	57	Night	2/25/2015 5:55:26 AM	1	72	Night
2/25/2015 5:24:27 AM	1	58	Night	2/25/2015 5:56:11 AM	1	60	Night
2/25/2015 5:25:15 AM	1	59	Night	2/25/2015 5:58:37 AM	1	46	Night
2/25/2015 5:27:28 AM	1	67	Night	2/25/2015 5:59:47 AM	1	48	Night
2/25/2015 5:28:34 AM	1	67	Night	2/25/2015 5:59:53 AM	1	58	Night
2/25/2015 5:29:16 AM	1	61	Night	2/25/2015 6:00:05 AM	1	57	Night
2/25/2015 5:30:56 AM	1	51	Night	2/25/2015 6:00:11 AM	1	62	Night
2/25/2015 5:33:18 AM	1	61	Night	2/25/2015 6:01:01 AM	1	50	Night
2/25/2015 5:35:01 AM	1	56	Night	2/25/2015 6:01:18 AM	1	58	Night
2/25/2015 5:35:04 AM	1	56	Night	2/25/2015 6:01:26 AM	1	64	Night
2/25/2015 5:36:19 AM	1	62	Night	2/25/2015 6:02:00 AM	1	62	Night
2/25/2015 5:37:07 AM	1	57	Night	2/25/2015 6:03:08 AM	1	56	Night
2/25/2015 5:37:38 AM	1	53	Night	2/25/2015 6:03:20 AM	1	52	Night
2/25/2015 5:38:17 AM	1	57	Night	2/25/2015 6:03:30 AM	1	73	Night
2/25/2015 5:39:45 AM	1	56	Night	2/25/2015 6:04:13 AM	1	60	Night
2/25/2015 5:43:23 AM	1	56	Night	2/25/2015 6:07:07 AM	1	59	Night
2/25/2015 5:43:25 AM	1	58	Night	2/25/2015 6:07:13 AM	1	61	Night
2/25/2015 5:43:30 AM	1	66	Night	2/25/2015 6:08:22 AM	1	58	Night

Table B.3 US 24/40 Lawrence, KS on February 26, 2015. Samples of Upstream Data (PRTs Only).

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/26/2015 6:36:59 AM	1	56	Sunrise	2/26/2015 6:49:07 AM	1	42	Sunrise
2/26/2015 6:37:21 AM	1	50	Sunrise	2/26/2015 6:49:32 AM	1	51	Sunrise
2/26/2015 6:37:23 AM	1	55	Sunrise	2/26/2015 6:50:02 AM	1	68	Sunrise
2/26/2015 6:37:28 AM	1	62	Sunrise	2/26/2015 6:50:20 AM	1	53	Sunrise
2/26/2015 6:37:31 AM	1	63	Sunrise	2/26/2015 6:50:39 AM	1	59	Sunrise
2/26/2015 6:38:03 AM	1	51	Sunrise	2/26/2015 6:50:42 AM	1	58	Sunrise
2/26/2015 6:38:04 AM	1	50	Sunrise	2/26/2015 6:50:44 AM	1	56	Sunrise
2/26/2015 6:38:06 AM	1	50	Sunrise	2/26/2015 6:50:53 AM	1	58	Sunrise
2/26/2015 6:38:23 AM	1	58	Sunrise	2/26/2015 6:50:54 AM	1	59	Sunrise
2/26/2015 6:38:26 AM	1	62	Sunrise	2/26/2015 6:51:18 AM	1	58	Sunrise
2/26/2015 6:38:35 AM	1	62	Sunrise	2/26/2015 6:52:01 AM	1	58	Sunrise
2/26/2015 6:39:07 AM	1	65	Sunrise	2/26/2015 6:52:02 AM	1	58	Sunrise
2/26/2015 6:39:38 AM	1	58	Sunrise	2/26/2015 6:52:37 AM	1	64	Sunrise
2/26/2015 6:40:28 AM	1	60	Sunrise	2/26/2015 6:52:40 AM	1	62	Sunrise
2/26/2015 6:40:45 AM	1	57	Sunrise	2/26/2015 6:52:49 AM	1	52	Sunrise
2/26/2015 6:41:11 AM	1	61	Sunrise	2/26/2015 6:52:54 AM	1	56	Sunrise
2/26/2015 6:41:13 AM	1	60	Sunrise	2/26/2015 6:53:29 AM	1	57	Sunrise
2/26/2015 6:41:34 AM	1	55	Sunrise	2/26/2015 6:53:41 AM	1	63	Sunrise
2/26/2015 6:41:35 AM	1	56	Sunrise	2/26/2015 6:54:02 AM	1	77	Sunrise
2/26/2015 6:42:38 AM	1	61	Sunrise	2/26/2015 6:54:08 AM	1	67	Sunrise
2/26/2015 6:43:21 AM	1	69	Sunrise	2/26/2015 6:54:22 AM	1	62	Sunrise
2/26/2015 6:44:03 AM	1	50	Sunrise	2/26/2015 6:56:00 AM	1	63	Sunrise
2/26/2015 6:44:18 AM	1	67	Sunrise	2/26/2015 6:56:01 AM	1	64	Sunrise
2/26/2015 6:44:30 AM	1	49	Sunrise	2/26/2015 6:56:10 AM	1	61	Sunrise
2/26/2015 6:44:32 AM	1	51	Sunrise	2/26/2015 6:56:14 AM	1	62	Sunrise
2/26/2015 6:44:59 AM	1	59	Sunrise	2/26/2015 6:56:17 AM	1	62	Sunrise
2/26/2015 6:45:03 AM	1	58	Sunrise	2/26/2015 6:56:25 AM	1	54	Sunrise
2/26/2015 6:45:19 AM	1	55	Sunrise	2/26/2015 6:56:27 AM	1	53	Sunrise
2/26/2015 6:45:21 AM	1	56	Sunrise	2/26/2015 6:56:29 AM	1	53	Sunrise
2/26/2015 6:45:43 AM	1	59	Sunrise	2/26/2015 6:56:30 AM	1	54	Sunrise
2/26/2015 6:46:32 AM	1	65	Sunrise	2/26/2015 6:56:31 AM	1	54	Sunrise
2/26/2015 6:46:46 AM	1	58	Sunrise	2/26/2015 6:56:32 AM	1	53	Sunrise
2/26/2015 6:46:52 AM	1	54	Sunrise	2/26/2015 6:57:18 AM	1	52	Sunrise
2/26/2015 6:47:06 AM	1	55	Sunrise	2/26/2015 6:57:23 AM	1	52	Sunrise
2/26/2015 6:47:17 AM	1	55	Sunrise	2/26/2015 6:57:26 AM	1	55	Sunrise
2/26/2015 6:47:31 AM	1	73	Sunrise	2/26/2015 6:57:43 AM	1	54	Sunrise
2/26/2015 6:48:20 AM	1	54	Sunrise	2/26/2015 6:57:59 AM	1	55	Sunrise

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/26/2015 7:49:41 AM	1	57	Day	2/26/2015 7:59:33 AM	1	58	Day
2/26/2015 7:49:58 AM	1	42	Day	2/26/2015 7:59:35 AM	1	57	Day
2/26/2015 7:50:00 AM	1	87	Day	2/26/2015 7:59:37 AM	1	61	Day
2/26/2015 7:50:01 AM	1	44	Day	2/26/2015 7:59:41 AM	1	52	Day
2/26/2015 7:50:40 AM	1	57	Day	2/26/2015 7:59:45 AM	1	57	Day
2/26/2015 7:51:25 AM	1	58	Day	2/26/2015 8:00:50 AM	1	62	Day
2/26/2015 7:51:32 AM	1	66	Day	2/26/2015 8:00:59 AM	1	54	Day
2/26/2015 7:51:49 AM	1	53	Day	2/26/2015 8:01:55 AM	1	57	Day
2/26/2015 7:52:09 AM	1	55	Day	2/26/2015 8:01:56 AM	1	56	Day
2/26/2015 7:52:10 AM	1	57	Day	2/26/2015 8:01:57 AM	1	56	Day
2/26/2015 7:52:27 AM	1	58	Day	2/26/2015 8:02:00 AM	1	54	Day
2/26/2015 7:52:50 AM	1	46	Day	2/26/2015 8:02:24 AM	1	60	Day
2/26/2015 7:53:07 AM	1	55	Day	2/26/2015 8:03:15 AM	1	61	Day
2/26/2015 7:53:10 AM	1	52	Day	2/26/2015 8:03:47 AM	1	47	Day
2/26/2015 7:53:20 AM	1	69	Day	2/26/2015 8:03:49 AM	1	48	Day
2/26/2015 7:53:47 AM	1	73	Day	2/26/2015 8:04:12 AM	1	54	Day
2/26/2015 7:53:57 AM	1	60	Day	2/26/2015 8:04:42 AM	1	58	Day
2/26/2015 7:54:34 AM	1	56	Day	2/26/2015 8:05:02 AM	1	61	Day
2/26/2015 7:54:35 AM	1	56	Day	2/26/2015 8:05:04 AM	1	63	Day
2/26/2015 7:54:45 AM	1	55	Day	2/26/2015 8:05:13 AM	1	60	Day
2/26/2015 7:54:53 AM	1	59	Day	2/26/2015 8:05:59 AM	1	58	Day
2/26/2015 7:55:18 AM	1	48	Day	2/26/2015 8:06:26 AM	1	60	Day
2/26/2015 7:55:20 AM	1	47	Day	2/26/2015 8:06:59 AM	1	56	Day
2/26/2015 7:55:22 AM	1	49	Day	2/26/2015 8:07:03 AM	1	53	Day
2/26/2015 7:55:23 AM	1	50	Day	2/26/2015 8:07:06 AM	1	57	Day
2/26/2015 7:55:26 AM	1	48	Day	2/26/2015 8:07:07 AM	1	56	Day
2/26/2015 7:55:28 AM	1	48	Day	2/26/2015 8:07:10 AM	1	53	Day
2/26/2015 7:55:30 AM	1	47	Day	2/26/2015 8:07:44 AM	1	44	Day
2/26/2015 7:55:52 AM	1	64	Day	2/26/2015 8:07:48 AM	1	46	Day
2/26/2015 7:56:27 AM	1	62	Day	2/26/2015 8:08:13 AM	1	54	Day
2/26/2015 7:56:55 AM	1	54	Day	2/26/2015 8:08:27 AM	1	51	Day
2/26/2015 7:56:56 AM	1	53	Day	2/26/2015 8:08:38 AM	1	58	Day
2/26/2015 7:56:59 AM	1	56	Day	2/26/2015 8:08:40 AM	1	58	Day
2/26/2015 7:57:20 AM	1	43	Day	2/26/2015 8:08:42 AM	1	59	Day
2/26/2015 7:57:51 AM	1	51	Day	2/26/2015 8:08:43 AM	1	59	Day
2/26/2015 7:58:01 AM	1	49	Day	2/26/2015 8:09:22 AM	1	55	Day
2/26/2015 7:58:57 AM	1	56	Day	2/26/2015 8:09:25 AM	1	58	Day

Date &Time	Lane	Speed (MPH)	Light Conditions	Date &Time	Lane	Speed (MPH)	Light Conditions
2/26/2015 12:12:49 AM	1	60	Night	2/26/2015 2:08:03 AM	1	46	Night
2/26/2015 12:13:20 AM	1	58	Night	2/26/2015 2:09:22 AM	1	67	Night
2/26/2015 12:13:29 AM	1	60	Night	2/26/2015 2:09:38 AM	1	79	Night
2/26/2015 12:13:49 AM	1	45	Night	2/26/2015 2:10:17 AM	1	58	Night
2/26/2015 12:13:51 AM	1	47	Night	2/26/2015 2:20:04 AM	1	54	Night
2/26/2015 12:15:55 AM	1	54	Night	2/26/2015 2:24:07 AM	1	57	Night
2/26/2015 12:16:56 AM	1	57	Night	2/26/2015 2:50:13 AM	1	62	Night
2/26/2015 12:17:54 AM	1	61	Night	2/26/2015 2:53:42 AM	1	71	Night
2/26/2015 12:19:44 AM	1	54	Night	2/26/2015 3:10:35 AM	1	52	Night
2/26/2015 12:21:11 AM	1	58	Night	2/26/2015 3:17:48 AM	1	61	Night
2/26/2015 12:21:17 AM	1	66	Night	2/26/2015 3:26:26 AM	1	44	Night
2/26/2015 12:23:18 AM	1	60	Night	2/26/2015 3:45:27 AM	1	59	Night
2/26/2015 12:26:27 AM	1	58	Night	2/26/2015 3:47:11 AM	1	50	Night
2/26/2015 12:27:30 AM	1	64	Night	2/26/2015 3:51:33 AM	1	65	Night
2/26/2015 12:28:20 AM	1	58	Night	2/26/2015 3:54:04 AM	1	54	Night
2/26/2015 12:33:44 AM	1	62	Night	2/26/2015 3:57:35 AM	1	67	Night
2/26/2015 12:35:29 AM	1	73	Night	2/26/2015 4:01:27 AM	1	53	Night
2/26/2015 12:36:24 AM	1	57	Night	2/26/2015 4:03:17 AM	1	51	Night
2/26/2015 12:43:53 AM	1	62	Night	2/26/2015 4:15:58 AM	1	60	Night
2/26/2015 12:49:00 AM	1	52	Night	2/26/2015 4:20:13 AM	1	53	Night
2/26/2015 12:51:15 AM	1	51	Night	2/26/2015 4:24:02 AM	1	58	Night
2/26/2015 12:53:45 AM	1	54	Night	2/26/2015 4:33:37 AM	1	63	Night
2/26/2015 12:54:15 AM	1	57	Night	2/26/2015 4:39:34 AM	1	64	Night
2/26/2015 1:07:51 AM	1	75	Night	2/26/2015 4:45:16 AM	1	37	Night
2/26/2015 1:12:10 AM	1	66	Night	2/26/2015 4:53:21 AM	1	58	Night
2/26/2015 1:15:04 AM	1	62	Night	2/26/2015 4:57:40 AM	1	59	Night
2/26/2015 1:15:20 AM	1	54	Night	2/26/2015 4:58:03 AM	1	64	Night
2/26/2015 1:18:57 AM	1	51	Night	2/26/2015 4:58:15 AM	1	59	Night
2/26/2015 1:19:33 AM	1	44	Night	2/26/2015 5:01:48 AM	1	59	Night
2/26/2015 1:25:18 AM	1	61	Night	2/26/2015 5:06:00 AM	1	63	Night
2/26/2015 1:25:42 AM	1	62	Night	2/26/2015 5:06:17 AM	1	71	Night
2/26/2015 1:27:44 AM	1	60	Night	2/26/2015 5:07:28 AM	1	58	Night
2/26/2015 1:29:15 AM	1	53	Night	2/26/2015 5:07:34 AM	1	56	Night
2/26/2015 1:30:15 AM	1	55	Night	2/26/2015 5:10:18 AM	1	60	Night
2/26/2015 1:43:01 AM	1	63	Night	2/26/2015 5:10:54 AM	1	59	Night
2/26/2015 2:05:32 AM	1	58	Night	2/26/2015 5:12:55 AM	1	64	Night
2/26/2015 2:06:25 AM	1	60	Night	2/26/2015 5:13:36 AM	1	54	Night

Table B.4 US 24/40 Lawrence, KS on March 3, 2015. Samples of iCone Data.

Local Time	No. Reads	Avg. Speed (mph)	Light Conditions	Local Time	No. Reads	Avg. Speed (mph)	Light Conditions
3/3/2015 13:51	5	54.00	Day	3/3/2015 14:36	6	53.67	Day
3/3/2015 13:52	5	51.00	Day	3/3/2015 14:37	8	55.75	Day
3/3/2015 13:53	7	49.14	Day	3/3/2015 14:38	8	53.88	Day
3/3/2015 13:54	11	46.55	Day	3/3/2015 14:39	16	52.63	Day
3/3/2015 13:55	6	29.50	Day	3/3/2015 14:40	7	57.00	Day
3/3/2015 13:56	10	48.00	Day	3/3/2015 14:41	5	59.00	Day
3/3/2015 13:57	11	42.46	Day	3/3/2015 14:42	4	58.25	Day
3/3/2015 13:58	6	44.50	Day	3/3/2015 14:43	8	56.38	Day
3/3/2015 13:59	8	50.13	Day	3/3/2015 14:44	7	57.71	Day
3/3/2015 14:00	4	59.50	Day	3/3/2015 14:45	9	54.22	Day
3/3/2015 14:01	4	54.50	Day	3/3/2015 14:46	12	52.83	Day
3/3/2015 14:02	9	52.00	Day	3/3/2015 14:47	4	55.75	Day
3/3/2015 14:03	10	46.00	Day	3/3/2015 14:48	5	52.00	Day
3/3/2015 14:04	10	56.50	Day	3/3/2015 14:49	10	45.50	Day
3/3/2015 14:05	8	61.38	Day	3/3/2015 14:50	3	52.00	Day
3/3/2015 14:06	7	60.57	Day	3/3/2015 14:51	6	60.33	Day
3/3/2015 14:07	8	50.75	Day	3/3/2015 14:52	5	60.00	Day
3/3/2015 14:08	12	52.42	Day	3/3/2015 14:53	9	55.89	Day
3/3/2015 14:09	7	55.57	Day	3/3/2015 14:54	11	56.09	Day
3/3/2015 14:10	11	56.55	Day	3/3/2015 14:55	10	56.50	Day
3/3/2015 14:11	9	58.67	Day	3/3/2015 14:56	6	57.00	Day
3/3/2015 14:12	4	57.00	Day	3/3/2015 14:57	6	56.17	Day
3/3/2015 14:13	7	54.14	Day	3/3/2015 14:58	12	56.17	Day
3/3/2015 14:14	9	56.44	Day	3/3/2015 14:59	8	55.75	Day
3/3/2015 14:15	9	55.33	Day	3/3/2015 15:00	11	56.55	Day
3/3/2015 14:16	1	57.00	Day	3/3/2015 15:01	10	55.00	Day
3/3/2015 14:17	7	57.71	Day	3/3/2015 15:02	4	60.75	Day
3/3/2015 14:18	10	56.00	Day	3/3/2015 15:03	9	62.00	Day
3/3/2015 14:19	6	56.17	Day	3/3/2015 15:04	5	61.00	Day
3/3/2015 14:20	7	54.14	Day	3/3/2015 15:05	7	59.14	Day
3/3/2015 14:21	4	59.50	Day	3/3/2015 15:06	8	53.25	Day
3/3/2015 14:22	5	57.00	Day	3/3/2015 15:07	9	62.00	Day
3/3/2015 14:23	5	61.00	Day	3/3/2015 15:08	9	56.44	Day
3/3/2015 14:24	8	55.75	Day	3/3/2015 15:09	14	58.07	Day
3/3/2015 14:25	7	57.00	Day	3/3/2015 15:10	12	57.42	Day
3/3/2015 14:26	6	56.17	Day	3/3/2015 15:11	6	54.50	Day
3/3/2015 14:27	9	57.56	Day	3/3/2015 15:12	12	58.25	Day
3/3/2015 14:28	12	57.42	Day	3/3/2015 15:13	10	59.00	Day
3/3/2015 14:29	4	54.50	Day	3/3/2015 15:14	5	57.00	Day
3/3/2015 14:30	11	55.18	Day	3/3/2015 15:15	15	56.33	Day
3/3/2015 14:31	10	54.50	Day	3/3/2015 15:16	8	56.38	Day
3/3/2015 14:32	9	53.11	Day	3/3/2015 15:17	6	56.17	Day
3/3/2015 14:33	8	57.63	Day	3/3/2015 15:18	9	56.44	Day
3/3/2015 14:34	3	58.67	Day	3/3/2015 15:19	12	56.17	Day
3/3/2015 14:35	11	59.27	Day	3/3/2015 15:20	10	57.50	Day

Table B.5 US 24/40 Lawrence, KS on March 17, 2015. Samples of Radar Recorder Data.

Date Time	Light Conditions	Count	Average Speed MPH	Date Time	Light Conditions	Count	Average Speed MPH
3/17/2015 12:04:49 PM	Day	28	61.29	3/17/2015 3:49:59 PM	Day	51	58.98
3/17/2015 12:09:45 PM	Day	27	59.74	3/17/2015 3:54:46 PM	Day	56	55.52
3/17/2015 12:14:55 PM	Day	40	57.90	3/17/2015 3:59:59 PM	Day	40	57.95
3/17/2015 12:19:58 PM	Day	43	57.07	3/17/2015 4:04:37 PM	Day	48	59.46
3/17/2015 12:24:44 PM	Day	53	52.53	3/17/2015 4:09:54 PM	Day	56	58.39
3/17/2015 12:29:59 PM	Day	39	57.23	3/17/2015 4:14:59 PM	Day	72	56.50
3/17/2015 12:34:53 PM	Day	43	57.14	3/17/2015 4:19:43 PM	Day	49	56.88
3/17/2015 12:39:57 PM	Day	34	58.26	3/17/2015 4:24:54 PM	Day	61	58.36
3/17/2015 12:44:59 PM	Day	37	59.19	3/17/2015 4:29:56 PM	Day	54	57.72
3/17/2015 12:49:53 PM	Day	39	56.28	3/17/2015 4:34:53 PM	Day	62	58.60
3/17/2015 12:54:56 PM	Day	40	58.08	3/17/2015 4:39:54 PM	Day	52	57.83
3/17/2015 12:59:57 PM	Day	29	58.55	3/17/2015 4:44:57 PM	Day	53	59.25
3/17/2015 1:04:58 PM	Day	23	61.57	3/17/2015 4:49:59 PM	Day	51	59.45
3/17/2015 1:09:43 PM	Day	22	61.14	3/17/2015 4:54:59 PM	Day	62	58.65
3/17/2015 1:14:57 PM	Day	31	57.94	3/17/2015 4:59:57 PM	Day	38	58.00
3/17/2015 1:19:55 PM	Day	40	54.28	3/17/2015 5:04:38 PM	Day	48	59.44
3/17/2015 1:24:15 PM	Day	34	58.65	3/17/2015 5:09:34 PM	Day	52	59.29
3/17/2015 1:29:36 PM	Day	39	59.33	3/17/2015 5:14:53 PM	Day	60	58.33
3/17/2015 1:34:58 PM	Day	37	57.89	3/17/2015 5:19:55 PM	Day	59	59.29
3/17/2015 1:39:58 PM	Day	21	57.71	3/17/2015 5:24:51 PM	Day	60	59.45
3/17/2015 1:44:51 PM	Day	38	56.53	3/17/2015 5:29:58 PM	Day	74	57.59
3/17/2015 1:49:42 PM	Day	25	60.88	3/17/2015 5:34:55 PM	Day	46	58.13
3/17/2015 1:54:59 PM	Day	34	56.88	3/17/2015 5:39:53 PM	Day	54	59.11
3/17/2015 1:59:59 PM	Day	28	57.93	3/17/2015 5:44:46 PM	Day	51	57.80
3/17/2015 2:04:59 PM	Day	39	56.90	3/17/2015 5:49:53 PM	Day	50	59.00
3/17/2015 2:09:32 PM	Day	27	59.31	3/17/2015 5:54:53 PM	Day	39	59.15
3/17/2015 2:14:59 PM	Day	30	56.80	3/17/2015 5:59:59 PM	Day	42	60.10
3/17/2015 2:19:41 PM	Day	30	57.63	3/17/2015 6:04:58 PM	Day	40	57.70
3/17/2015 2:24:55 PM	Day	27	57.30	3/17/2015 6:09:46 PM	Day	43	60.02
3/17/2015 2:29:45 PM	Day	35	55.17	3/17/2015 6:14:57 PM	Day	25	58.84
3/17/2015 2:34:51 PM	Day	38	56.76	3/17/2015 6:19:58 PM	Day	24	58.29
3/17/2015 2:39:51 PM	Day	35	57.43	3/17/2015 6:24:50 PM	Day	40	58.00
3/17/2015 2:44:54 PM	Day	46	55.70	3/17/2015 6:29:47 PM	Day	45	58.11
3/17/2015 2:49:56 PM	Day	63	56.46	3/17/2015 6:34:53 PM	Day	26	59.73
3/17/2015 2:54:40 PM	Day	58	55.78	3/17/2015 6:39:53 PM	Day	47	60.79
3/17/2015 2:59:57 PM	Day	62	56.13	3/17/2015 6:44:25 PM	Day	28	59.82
3/17/2015 3:04:54 PM	Day	64	57.97	3/17/2015 6:49:49 PM	Day	38	57.16
3/17/2015 3:09:55 PM	Day	53	54.89	3/17/2015 6:54:30 PM	Day	31	58.13
3/17/2015 3:14:48 PM	Day	48	59.04	3/17/2015 6:59:47 PM	Day	35	55.97
3/17/2015 3:19:59 PM	Day	48	57.77	3/18/2015 7:59:52 AM	Day	40	56.98
3/17/2015 3:24:49 PM	Day	41	58.02	3/18/2015 8:04:58 AM	Day	60	35.57
3/17/2015 3:29:59 PM	Day	54	55.20	3/18/2015 8:09:44 AM	Day	52	41.27
3/17/2015 3:34:47 PM	Day	42	58.14	3/18/2015 8:14:59 AM	Day	34	54.76
3/17/2015 3:39:59 PM	Day	33	59.88	3/18/2015 8:19:49 AM	Day	31	58.77
3/17/2015 3:44:56 PM	Day	38	60.63	3/18/2015 8:24:54 AM	Day	32	51.47

Table B.6 US 24/40 Lawrence, KS on March 17, 2015. Samples of Wavetronix SmartSensor HD Data.

Date & Time	Light Conditions	Volume	Avg. Speed MPH	Date & Time	Light Conditions	Volume	Avg. Speed MPH
3/24/2015 7:54:34 AM	Day	51	53.41	3/24/2015 11:39:56 AM	Day	26	48.69
3/24/2015 7:59:57 AM	Day	49	48.41	3/24/2015 11:44:59 AM	Day	20	49.80
3/24/2015 8:04:45 AM	Day	36	46.31	3/24/2015 11:49:21 AM	Day	33	46.06
3/24/2015 8:09:38 AM	Day	32	49.78	3/24/2015 11:54:39 AM	Day	38	49.87
3/24/2015 8:14:36 AM	Day	30	51.50	3/24/2015 11:59:51 AM	Day	25	48.96
3/24/2015 8:19:54 AM	Day	54	49.81	3/24/2015 12:04:59 PM	Day	24	50.33
3/24/2015 8:24:58 AM	Day	52	47.58	3/24/2015 12:09:34 PM	Day	33	50.58
3/24/2015 8:29:56 AM	Day	35	48.14	3/24/2015 12:14:35 PM	Day	19	49.00
3/24/2015 8:34:58 AM	Day	52	46.69	3/24/2015 12:19:56 PM	Day	38	44.92
3/24/2015 8:39:38 AM	Day	32	55.69	3/24/2015 12:24:52 PM	Day	21	44.00
3/24/2015 8:44:44 AM	Day	33	44.39	3/24/2015 12:29:59 PM	Day	33	45.82
3/24/2015 8:49:47 AM	Day	36	45.94	3/24/2015 12:34:53 PM	Day	32	50.09
3/24/2015 8:54:30 AM	Day	20	46.25	3/24/2015 12:39:53 PM	Day	30	48.77
3/24/2015 8:59:54 AM	Day	31	46.71	3/24/2015 12:44:58 PM	Day	31	54.13
3/24/2015 9:04:56 AM	Day	25	48.68	3/24/2015 12:48:40 PM	Day	30	48.50
3/24/2015 9:09:55 AM	Day	35	49.40	3/24/2015 12:54:55 PM	Day	23	51.74
3/24/2015 9:14:42 AM	Day	24	46.54	3/24/2015 12:59:29 PM	Day	30	56.20
3/24/2015 9:19:50 AM	Day	24	44.75	3/24/2015 1:04:51 PM	Day	35	52.89
3/24/2015 9:24:41 AM	Day	28	44.64	3/24/2015 1:09:40 PM	Day	33	51.18
3/24/2015 9:29:42 AM	Day	24	46.63	3/24/2015 1:14:31 PM	Day	36	48.25
3/24/2015 9:34:50 AM	Day	34	48.56	3/24/2015 1:19:56 PM	Day	37	52.38
3/24/2015 9:39:44 AM	Day	25	46.40	3/24/2015 1:24:56 PM	Day	36	48.47
3/24/2015 9:44:54 AM	Day	29	45.76	3/24/2015 1:29:30 PM	Day	26	47.15
3/24/2015 9:49:07 AM	Day	24	51.33	3/24/2015 1:34:57 PM	Day	33	51.06
3/24/2015 9:54:43 AM	Day	24	49.54	3/24/2015 1:39:46 PM	Day	27	50.44
3/24/2015 9:59:51 AM	Day	27	47.59	3/24/2015 1:44:45 PM	Day	45	53.80
3/24/2015 10:04:47 AM	Day	27	45.48	3/24/2015 1:49:59 PM	Day	33	51.12
3/24/2015 10:09:03 AM	Day	24	42.13	3/24/2015 1:54:58 PM	Day	29	46.76
3/24/2015 10:14:58 AM	Day	37	48.35	3/24/2015 1:59:13 PM	Day	27	47.07
3/24/2015 10:19:57 AM	Day	23	49.87	3/24/2015 2:04:59 PM	Day	30	54.97
3/24/2015 10:24:50 AM	Day	32	46.09	3/24/2015 2:09:44 PM	Day	26	50.42
3/24/2015 10:29:58 AM	Day	38	44.82	3/24/2015 2:14:58 PM	Day	35	48.74
3/24/2015 10:34:43 AM	Day	32	46.31	3/24/2015 2:19:46 PM	Day	28	47.07
3/24/2015 10:39:52 AM	Day	34	49.94	3/24/2015 2:24:56 PM	Day	28	49.86
3/24/2015 10:44:45 AM	Day	30	49.13	3/24/2015 2:29:52 PM	Day	37	49.70
3/24/2015 10:49:52 AM	Day	37	47.70	3/24/2015 2:34:54 PM	Day	44	53.80
3/24/2015 10:54:52 AM	Day	29	49.31	3/24/2015 2:39:16 PM	Day	34	51.82
3/24/2015 10:59:56 AM	Day	35	44.83	3/24/2015 2:44:49 PM	Day	47	51.30
3/24/2015 11:04:49 AM	Day	29	47.69	3/24/2015 2:49:46 PM	Day	34	49.85
3/24/2015 11:09:58 AM	Day	33	42.55	3/24/2015 2:54:57 PM	Day	38	50.45
3/24/2015 11:14:57 AM	Day	34	47.18	3/24/2015 2:59:58 PM	Day	37	51.43
3/24/2015 11:19:56 AM	Day	15	47.27	3/24/2015 3:04:56 PM	Day	35	47.49
3/24/2015 11:24:39 AM	Day	30	54.03	3/24/2015 3:09:59 PM	Day	29	46.59

11.3 Appendix C. (Statistical Analysis)

Table C.1 Different of Speed between Upstream and Downstream (PRTs Only).

Lane		Lane 1			Lane 2		
Date		2/24/2015	2/25/2015	2/26/2015	2/24/2015	2/25/2015	2/26/2015
Day	Upstream	57.514	56.477	56.317	60.486	60.005	59.829
	Downstream	58.038	57.146	56.822	53.781	52.976	53.397
	Δ	-0.524	-0.670	-0.505	6.705	7.030	6.431
Night	Upstream	56.937	57.115	57.127	60.042	59.994	60.214
	Downstream	56.946	56.903	57.364	53.967	53.788	53.757
	Δ	-0.009	0.212	-0.237	6.075	6.207	6.457
Sunrise	Upstream	59.186	58.855	59.253	62.810	61.145	62.571
	Downstream	59.226	58.511	59.345	55.958	55.031	55.527
	Δ	-0.040	0.343	-0.093	6.852	6.114	7.044
Sunset	Upstream	57.271	56.593	57.181	59.005	56.966	58.150
	Downstream	57.179	56.429	57.598	52.900	51.000	51.709
	Δ	0.093	0.164	-0.417	6.104	5.966	6.441

Table C.2 US 24/40 Lawrence, KS on March 10-12, 2015 Avg. Volume & Speed for iCone

Date	Light	Count	Speed
All	Day	38.12	56.19
3/10/2015	Day	37.74	56.12
3/11/2015	Day	39.53	56.17
3/12/2015	Day	36.63	56.31
All	Night	17.60	56.35
3/10/2015	Night	15.32	55.30
3/11/2015	Night	18.42	56.40
3/12/2015	Night	17.51	56.94
All	Sunrise	46.88	57.25
3/10/2015	Sunrise		
3/11/2015	Sunrise	46.50	57.42
3/12/2015	Sunrise	47.25	57.08
All	Sunset	27.30	56.79
3/10/2015	Sunset	26.17	56.76
3/11/2015	Sunset	28.55	56.83
3/12/2015	Sunset		
All	All	28.02	56.23

Table C.3 Different in Volume and Speed Detected by iCone and PRTs.

Date	Light	Δ Volume	Δ Speed
All	Day	-2.86	0.82
3/10/2015	Day	-0.96	1.03
3/11/2015	Day	-4.06	0.85
3/12/2015	Day	-3.85	0.47
All	Night	-4.85	0.93
3/10/2015	Night	-6.53	0.99
3/11/2015	Night	-5.69	1.10
3/12/2015	Night	-2.19	0.65
All	Sunrise	-12.40	-0.09
3/10/2015	Sunrise	-12.47	-0.09
3/11/2015	Sunrise	-10.12	-0.29
3/12/2015	Sunrise	-14.83	0.11
All	Sunset	-9.02	0.00
3/10/2015	Sunset	-4.75	0.51
3/11/2015	Sunset	-13.16	-0.47
3/12/2015	Sunset	-8.96	0.02
All	All	-2.02	0.87

Table C.4 US 24/40 Lawrence, KS on March 17-19. Avg. Count & Speed for Radar Recorder

Date	Light	Volume	Speed
All	Day	38.86	55.80
3/17/2015	Day	42.82	58.07
3/18/2015	Day	41.03	52.52
3/19/2015	Day	34.24	57.62
All	Night	8.96	57.17
3/17/2015	Night	9.50	57.68
3/18/2015	Night	9.30	56.22
3/19/2015	Night	8.42	57.97
All	Sunrise	38.08	59.09
3/17/2015	Sunrise		
3/18/2015	Sunrise	38.83	59.17
3/19/2015	Sunrise	37.33	59.00
All	Sunset	21.00	56.93
3/17/2015	Sunset	21.06	57.00
3/18/2015	Sunset	21.00	55.09
3/19/2015	Sunset	20.92	58.65

Table C.5 Different in Volume and Speed Detected by Radar Recorder and PRTs.

Date	Light	Δ Volume	Δ Speed
All	Day	-2.95	1.44
3/17/2015	Day	-3.49	-0.75
3/18/2015	Day	-5.86	4.13
3/19/2015	Day	-0.21	0.15
All	Night	-0.79	0.13
3/17/2015	Night	-0.43	-1.15
3/18/2015	Night	-1.02	1.07
3/19/2015	Night	-0.67	-0.41
All	Sunrise	-1.96	0.60
3/17/2015	Sunrise	-1.96	0.60
3/18/2015	Sunrise	-0.50	0.23
3/19/2015	Sunrise	-3.42	0.96
All	Sunset	-0.95	0.18
3/17/2015	Sunset	-0.56	-0.12
3/18/2015	Sunset	-1.92	1.44
3/19/2015	Sunset	-0.58	-0.65
All	All	-1.78	0.81

Table C.6 US 24/40 Lawrence, KS on March 24-26, 2015 Wavetronix SmartSensor HD Data (Five-Minute Interval).

Date	Light Conditions	Volume (veh.)	Speed (MPH)
All	Day	37.28	49.95
3/24/2015	Day	36.22	49.49
3/25/2015	Day	37.07	50.11
3/26/2015	Day	38.52	50.24
All	Night	8.46	50.73
3/24/2015	Night	8.30	50.99
3/25/2015	Night	8.55	50.92
3/26/2015	Night	8.54	50.26
All	Sunrise	44.89	50.86
3/24/2015	Sunrise	44.92	49.82
3/25/2015	Sunrise	43.92	52.28
3/26/2015	Sunrise	45.83	50.48
All	Sunset	19.38	51.79
3/24/2015	Sunset	18.58	51.07
3/25/2015	Sunset	19.38	50.59
3/26/2015	Sunset	20.17	53.80

Table C.7 Different in Volume and Speed Detected by Wavetronix Smartsensor HD and PRTs.

Date	Light	Δ Volume	Δ Speed
All	Day	-0.27	-1.35
3/24/2015	Day	-0.50	-1.13
3/25/2015	Day	0.01	-1.42
3/26/2015	Day	-0.28	-1.46
All	Night	0.17	-0.59
3/24/2015	Night	0.32	-0.15
3/25/2015	Night	-0.01	-0.85
3/26/2015	Night	0.20	-0.79
All	Sunrise	-0.11	-2.63
3/24/2015	Sunrise	-0.17	-2.12
3/25/2015	Sunrise	-0.01	-2.34
3/26/2015	Sunrise	-0.17	-3.32
All	Sunset	0.20	-0.16
3/24/2015	Sunset	-0.11	-0.25
3/25/2015	Sunset	0.92	-0.80
3/26/2015	Sunset	-0.22	0.66
All	All	-0.26	-1.12

Table C.8 T-Test for Upstream and Downstream of PRTs- No other Devices / Lane 1

Location	No.	Mean	St. Dev.	Difference (mph)	P-Value	Light Conditions	Week
Lane 1-Upstream	8527	56.88	6.04	-0.3881	<0.05	All Time	1st
Lane 1-Downstream	8479	57.26	5.26				1st
Lane 1-Upstream	5670	56.65	6.19	-0.583	<0.05	Day	1st
Lane 1-Downstream	5624	57.24	5.38				1st
Lane 1-Upstream	1716	57.07	5.79	-0.008	0.968	Night	1st
Lane 1-Downstream	1717	57.08	5.28				1st
Lane 1-Upstream	552	59.1	5.4	0.209	0.520	Sunrise	1st
Lane 1-Downstream	375	58.89	4.43				1st
Lane 1-Upstream	763	57.02	5.61	-0.06	0.817	Sunset	1st
Lane 1-Downstream	763	57.08	4.5				1st

Table C.9 T-Test for Upstream and Downstream of PRTs - No other Devices / Lane 2

Location	No.	Mean	St. Dev.	Difference (mph)	P-Value	Light Conditions	Week
Lane 2-Upstream	8185	60.02	5.87	6.5969	<0.05	All Time	1st
Lane 2-Downstream	8227	53.42	5.33				1st
Lane 2-Upstream	5554	60.03	5.56	6.737	<0.05	Day	1st
Lane 2-Downstream	5575	53.29	5.27				1st
Lane 2-Upstream	1364	60.08	6.16	6.259	<0.05	Night	1st
Lane 2-Downstream	1376	53.82	5.42				1st
Lane 2-Upstream	600	62.01	5.81	6.496	<0.05	Sunrise	1st
Lane 2-Downstream	595	55.51	4.27				1st
Lane 2-Upstream	667	58.01	7.11	6.165	<0.05	Sunset	1st
Lane 2-Downstream	681	51.85	5.78				1st

Table C.10 T-Test for Upstream and Downstream of PRTs with iCone / Lane 1

Location	No.	Mean	St. Dev.	Difference (mph)	P-Value	Light Conditions	Week
Lane 1-Upstream	8315	53.27	6.05	-5.3458	<0.05	All Time	2nd
Lane 1-Downstream	8171	58.61	6.51				2nd
Lane 1-Upstream	5855	53.01	6.24	-5.507	<0.05	Day	2nd
Lane 1-Downstream	5490	58.52	6.46				2nd
Lane 1-Upstream	1545	53.47	5.65	-5.058	<0.05	Night	2nd
Lane 1-Downstream	1655	58.53	7.33				2nd
Lane 1-Upstream	362	55.19	5.25	-5.232	<0.05	Sunrise	2nd
Lane 1-Downstream	350	60.42	4.66				2nd
Lane 1-Upstream	553	54.14	5.24	-4.506	<0.05	Sunset	2nd
Lane 1-Downstream	676	58.65	5.4				2nd

Table C.11 T-Test for Upstream and Downstream of PRTs with iCone / Lane 1

Location	No.	Mean	St. Dev.	Difference	P-Value	Light Conditions	Week
Lane 1-Upstream	8083	52.56	6.83	-7.077	<0.05	All Time	3rd
Lane 1-Downstream	8013	59.63	7.07				3rd
Lane 1-Upstream	6032	52.41	6.9	-6.998	<0.05	Day	3rd
Lane 1-Downstream	6148	59.41	6.54				3rd
Lane 1-Upstream	1425	53.21	6.5	-7.56	<0.05	Night	3rd
Lane 1-Downstream	1301	60.77	8.12				3rd
Lane 1-Upstream	324	52.69	7.63	-7.164	<0.05	Sunrise	3rd
Lane 1-Downstream	311	59.8	11.4				3rd
Lane 1-Upstream	302	52.27	5.83	-6.752	<0.05	Sunset	3rd
Lane 1-Downstream	253	59.02	6.12				3rd

Table C.12 T-Test for Upstream and Downstream of PRTs with Radar Recorder / Lane 1

Location	No.	Mean	St. Dev.	Difference (mph)	P-Value	Light Conditions	Week
Lane 1-Upstream	3678	53.05	7.28	-0.816	<0.05	All Time	4th
Lane 1-Downstream	3786	53.86	6.14				4th
Lane 1-Upstream	2876	52.81	7.48	-1.18	<0.05	Day	4th
Lane 1-Downstream	6702	53.99	5.28				4th
Lane 1-Upstream	535	53.5	7.04	-0.88	<0.05	Night	4th
Lane 1-Downstream	1282	54.38	4.81				4th
Lane 1-Upstream	318	54.49	5.74	-0.686	<0.05	Sunrise	4th
Lane 1-Downstream	622	55.18	3.91				4th
Lane 1-Upstream	326	53.52	6.24	-0.859	<0.05	Sunset	4th
Lane 1-Downstream	850	54.4	11.1				4th

Table C.13 T-Test for Upstream and Downstream of PRTs with Wavetronix / Lane 2

Location	No.	Mean	St. Dev.	Difference (mph)	P-Value	Light Conditions	Week
Lane 1-Upstream	4354	59.29	6.65	10.894	<0.05	All Time	6th
Lane 1-Downstream	4519	48.4	9.73				6th
Lane 1-Upstream	2840	59.15	7.21	11.181	<0.05	Day	6th
Lane 1-Downstream	2994	47.97	9.97				6th
Lane 1-Upstream	701	59.31	5.26	9.651	<0.05	Night	6th
Lane 1-Downstream	706	49.66	7.89				6th
Lane 1-Upstream	703	60.01	5.6	10.823	<0.05	Sunrise	6th
Lane 1-Downstream	689	49.2	10.3				6th
Lane 1-Upstream	110	58.05	5.12	10.894	<0.05	Sunset	6th
Lane 1-Downstream	131	47.16	8.95				6th

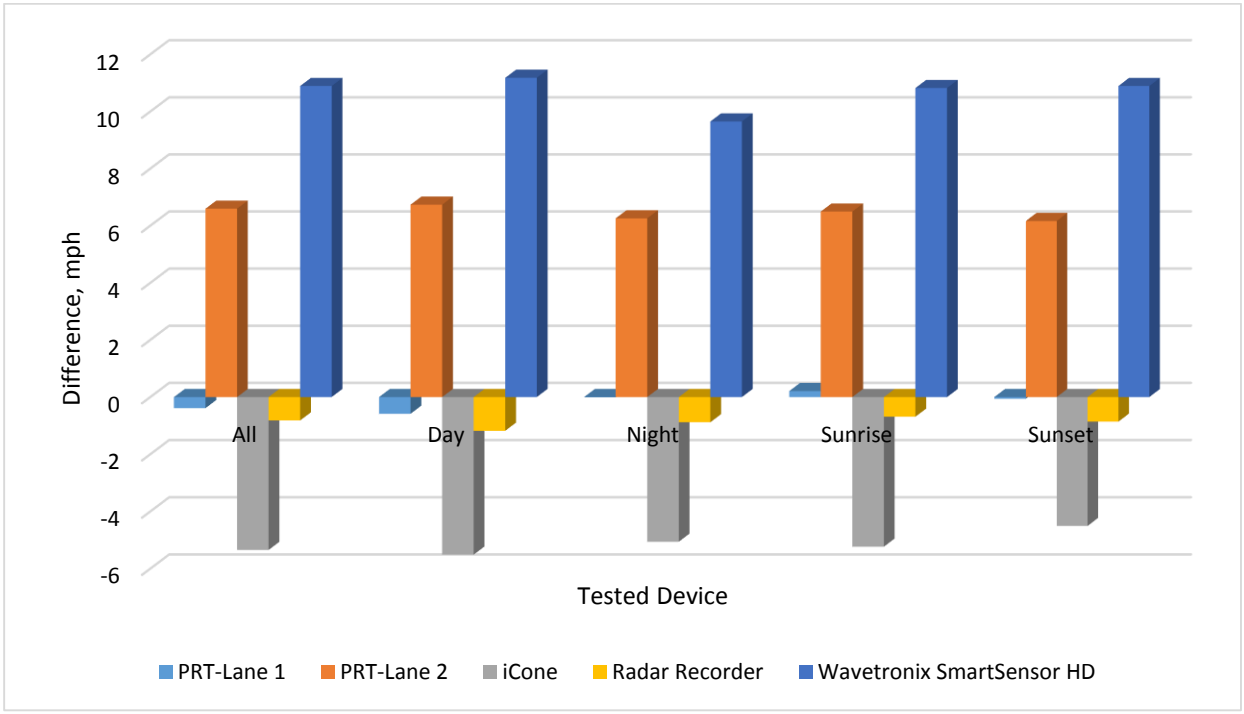

Figure C.1 Summary of Difference in the Speed between Upstream and Downstream at All Light Conditions